

MODERN Machine Shop

JULY, 1944

VOL. 17, No. 2

CINCINNATI, OHIO

We Present---

— as the feature article in this month's issue—an excellent story entitled "Putting a New Model Airplane into Production." Written by Bert Loyd, Superintendent of Manufacturing Engineering, and Robert Trumpis, General Department Manager, Manufacturing Planning, Factory "A," Lockheed Aircraft Corporation, this article illustrates and describes a new conception of planning for new model production.

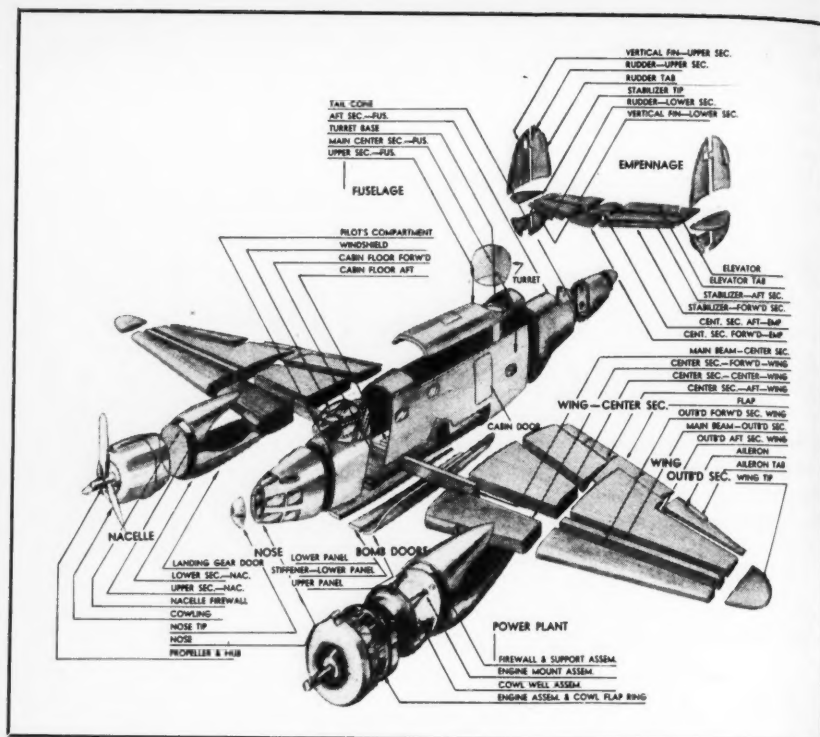
— on page 140—J. D. Ratcliff's "Let's Go Metric!" In this article, Mr. Ratcliff, Editor of "Science Yearbook of 1944," clearly explains the metric system of measurement and how its adoption would save time, money, and headaches.

— on page 158—a story on the building of LCM-3 landing barges at the Warren, Ohio, plant of the Warren City Manufacturing Company. Produced and tested under actual sea conditions hundreds of miles from salt water, these mechanized landing craft each measure 50 feet long x 14 feet wide and weigh approximately 25 tons. Power is provided by Diesel engines.

— on page 174—"When the Boys Come Home"—an article by H. A. Vonachen, M.D., Medical Director, Caterpillar Tractor Company, Peoria, Illinois, outlining the program developed by his firm for the employment of handicapped workers. The program described herein should prove of particular interest to all employers faced with the task of placing returning ex-service men in suitable jobs.

— on page 198—a description of the process developed and in use at the Industrial Steel Treating Company of Jackson, Michigan, for the selective copper brazing of ordnance parts on a high production basis. The process employs electric salt bath furnaces which not only permit the selective heating of the parts to be brazed but also eliminate decarburization, reducing scrap from 15 per cent to a maximum of 3 per cent as compared with conventional methods.

— on page 212—the regular "Ideas from Readers" department in which are presented the designs, together with explanations, of tools, fixtures, and devices that have been devised to greatly facilitate and speed up the performance of certain difficult or time-consuming tasks. Other regular features include illustrated announcements of new shop equipment and materials and cartoon.



Putting A New Model Airplane into Production

By BERT LOYD, Superintendent of Manufacturing Engineering, and ROBERT TRUMPIS, General Department Manager, Manufacturing Planning, Factory A, Lockheed Aircraft Corporation

WITH the accumulation of experience in the production of aircraft, means and methods for the production of new models improve. To "do better today what was done

yesterday" is a consummation as devoutly to be wished in aircraft production as it was in the production of automobiles, radios, refrigerators, and other products.

At Lockheed's Factory "A," formerly the Vega Aircraft Company, a new conception of planning for new model production has been developed which is strikingly modern. The development is unique in comparison to what the authors have seen in personal examinations of methods in use in approximately sixteen aircraft plants in the East and Midwest, as well as on the West Coast.

Ship Breakdown

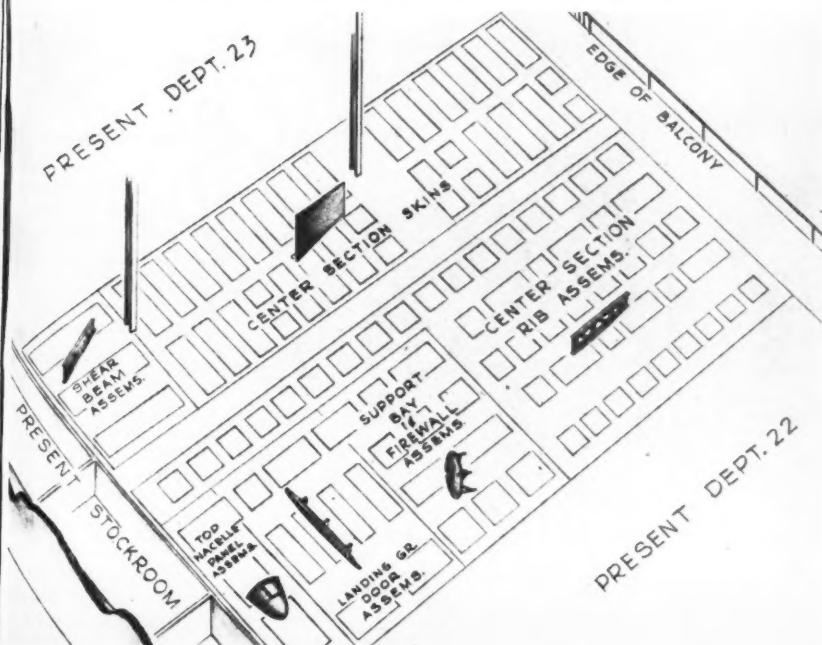
Through the initial stages of proposal preparation for the latest model of Lockheed aircraft, the Manufacturing Planning Organization worked in close conjunction with the Engineering Department in developing a ship "breakdown."

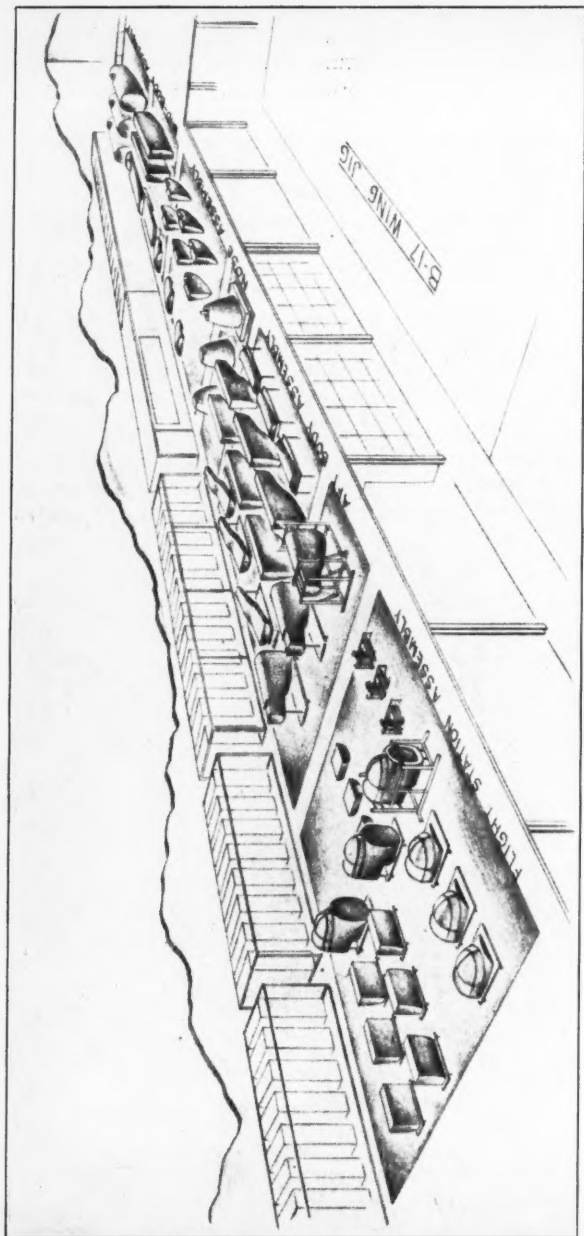
This breakdown was established between the Engineering and Manufacturing Planning Departments on the basis of best production suitability as recommended by the Manufacturing Planning Department and as altered from this premise by design requirements. A typical ship breakdown is illustrated at the head of this article.

Planning Project

As soon as the basic ship breakdown had been developed, the planning project was prepared. Two groups of manufacturing planning production processes were established; the first group assigned to plan and aid in the building of the prototype ship, and the second group assigned to handle the production

Process Layout; Preliminary Production Line Department 22





Process Layout; Preliminary Production Line Department 23

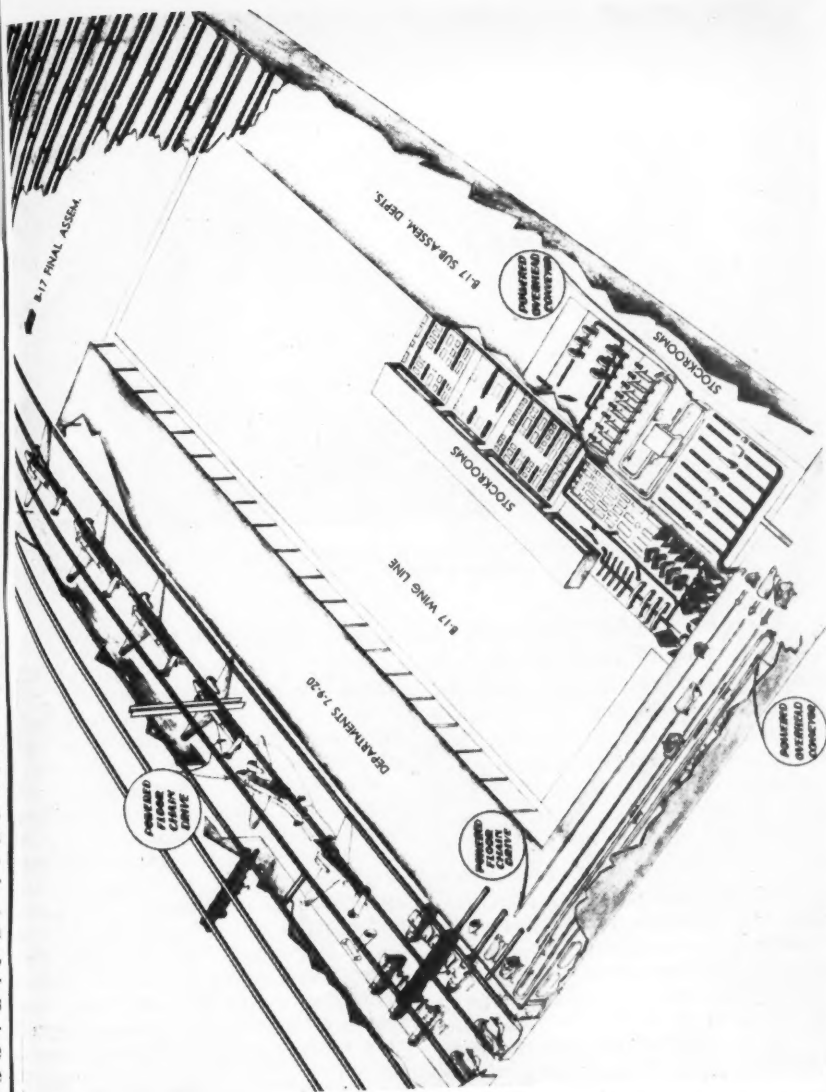
problems of tool planning, assembly sequence planning, operation sheet preparation, kit list preparation (parts disbursement list), and incorporation of engineering changes.

A third and separate group of production processors was assigned to the task of establishing the physical requirements area-wise for the new model. Taking into consideration the sequence of operations as planned by the production planners of the second group, together with the estimated production requirements, they outlined approximate area requirements both for production operations and for stockrooms. Working from these estimates, the group surveyed the shop so as to obtain a correct draft of the amount and shape of the available floor space, then they moved assemblies and "juggled" production operations and equipment until

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July, 1944



Model of New Ship Area, Including Final Production Line, Conveyors, Jigs, Overhead Cranes, Benches, Cribs, and Stockrooms

the best possible arrangement was obtained. In fact, they juggled some of the subassembly operations out of the

shop entirely, to outlying plants of the Lockheed Company and to independent subcontractors.

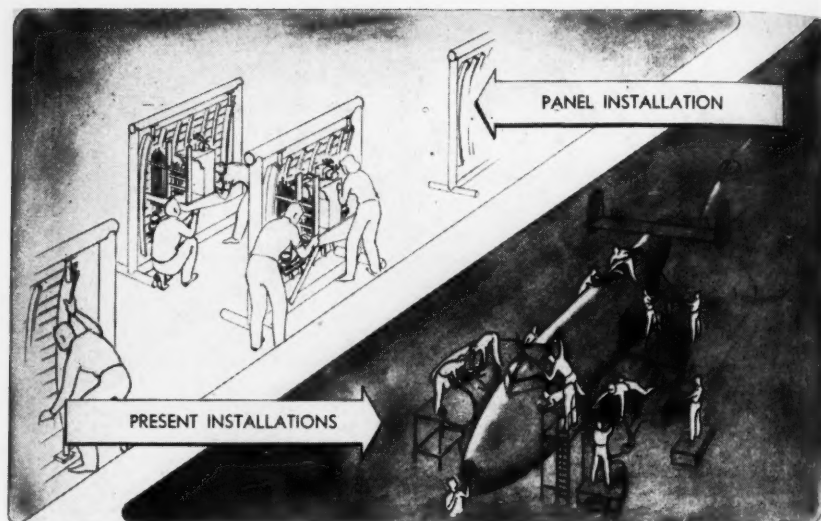


Illustration from Brochure Showing Present Installation and New Installation for Building Panel of New Ship

Process Layouts

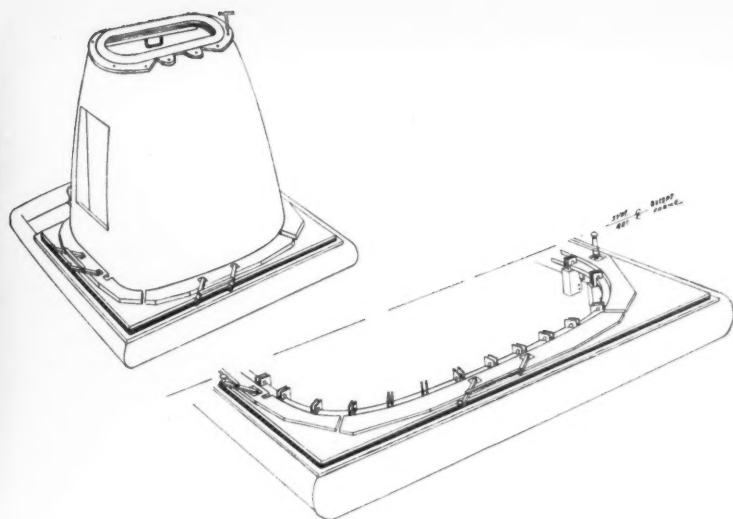
Process layouts were prepared in two stages. Stage 1 was called the preliminary production line; Stage 2 was called the final production line. A survey of schedule positions of the ships leaving the production lines showed that a concurrence of production between old model completion and new model inception would be likely to exist for several months. Thus the consideration of space requirement became an even more important problem. More planning and re-planning was necessary; more squeezing in of operations was done, and more production layouts were prepared. Finally, a preliminary production-line layout was established which was designed for the production of one ship per day of the new model, without interfering with the operations and activities necessary to the completion of the old models.

Educational Brochure

With the new layout accomplished, detail layouts were prepared. Then a model of the entire area was built, duplicating in minute detail the final production line with its conveyors, overhead cranes, workbenches, tool cribs, and stockrooms. From this model the production processors studied the flow of materials, stationizing of the production line, assembly operations sequence, traffic, and material handling problems. During this study a detailed brochure was prepared and issued which discussed and illustrated operating conditions and served as a means of introducing the new model to the Lockheed organization.

Prototype Development

While the physical area studies were progressing, the first group, designated as the prototype planners and processors, were working with



Lockheed Nose Section Assembly Jig

the engineers on the floor, proceeding as far as possible on the incomplete information thus far available, hand layouts, and dimensional developments. Shop orders were prepared with planned operation sequence; assembly parts lists were written to establish part requirements.

The new Modification Department is maintained under the same management as the Manufacturing Planning Departments, as a self-supporting fabrication and assembly shop apart from the regular production facilities. To this department was given the responsibility of building the prototype and such ships as were necessary in the planned preliminary locations.

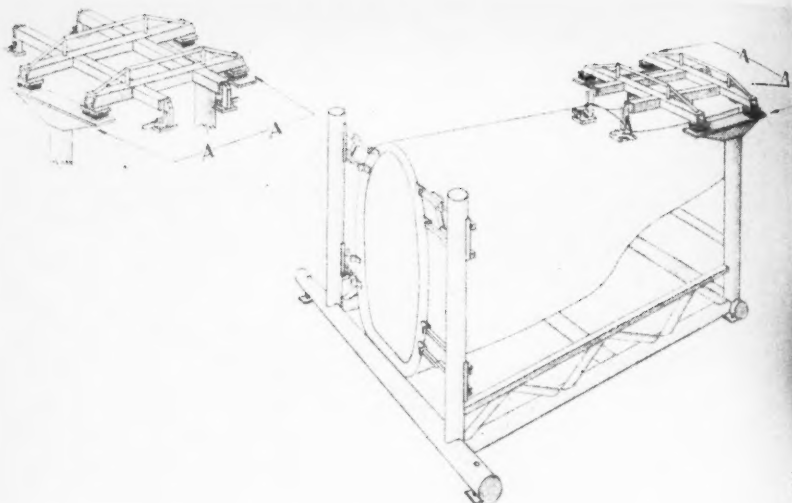
As the building of the prototype progressed a stock of proved engineering data was accumulated; production releases of engineering information became available, and the second group of production processors swung into action.

Functions of Manufacturing Engineering Division

At this point it might be well to present a brief description of the organization at Lockheed Factory "A" which was responsible for this program. This organization is the Manufacturing Engineering Division and is the organization upon which is placed the responsibility of taking the product design and either preparing or developing the information upon which a plan can be based to serve as a guide for the production departments for assembling or building the ship or portions of the ship as required.

Thus when a new product design is developed, the departments of the Manufacturing Engineering Division are charged with the responsibility for preparing:

1. Tool Planning.
2. Tool Design.
3. Scheduling and Follow-Up of Tool



Assembly Jig for Alt Body Section

- Building.
4. Shop Orders to Produce Parts Planned, with Operation Sequence for Each.
5. Operation Sheets.
6. Production Illustrations.
7. Kit Lists (Reconciled Engineering Parts Lists).
8. Change Incorporations.
9. Process Layouts and Area Requirements.
10. Orders for Moves to Clear Areas in Preparation for New Production Operations.
11. Orders for Moves to Set Up Areas for Required Production.
12. Shop Follow-Up and Tool Correction.
13. Building of Prototype Assemblies, Changes, or Mock-Ups.
14. Building of Parts between Point Change Incorporated in Prototype Assemblies and Point Change Subsequently Handled by Regular Production Methods.

These departments in the Manufacturing Engineering Division work

as a team throughout the job. Production planning in all of its various ramifications is the responsibility of the Manufacturing Planning Departments; the designing of the necessary tools is up to the Tool Engineering Departments; ship construction and modifications is the task of the New Modifications Department, and the Manufacturing Engineering Control Department is responsible for the control and scheduling of the entire program, plus control and scheduling of the production tools and equipment in process in the tool shops.

Mobilization for Production

With a difficult schedule to meet, the major assembly tools to be used in the building of the prototype were so designed that they could be used in the preliminary line production. As soon as the prototype had passed to completion through the various assembly stages, the tools were moved from the new modifications shop to the already prepared and cleared preliminary line areas. Here the sec-

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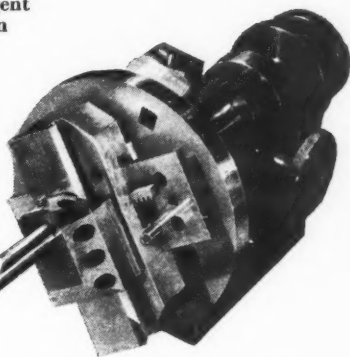
1 Sets radius accurately to within .0001.

2 Returns diamond to center after dressing an angle within .00005.

3 Dresses a smaller than .050 radius to a full half circle without additional attachments.

4 Diamond automatically locates on center.

5 Perfect blend between radius and angle of tangency.



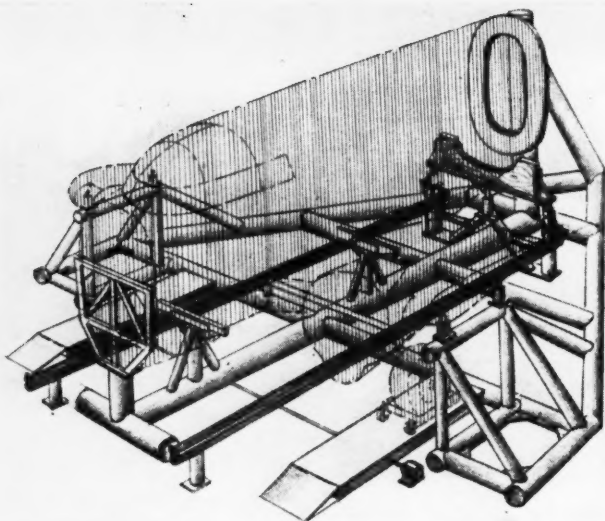
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Fixture



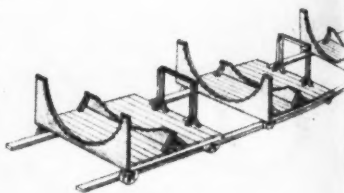
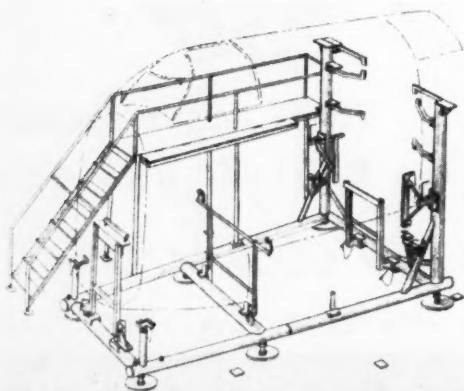
and big service organization—Plant Engineering—became the important cog, with special emphasis on the Equipment Design and Layout Departments.

As rapidly as the Manufacturing Planning Section could prepare the plans, the Equipment Design and Layout Department prepared dimen-

sional documents and issued orders to the construction crews, millwrights, electricians, plumbers and painters, on to the construction contractors to clear the necessary areas, move equipment, install overhead cranes, alter building design, and do whatever else was necessary to clear

the way for the inauguration of the new production program. A blue color scheme was adopted for all tools and equipment involved in this program, the major purpose of the color being to definitely designate each tool so painted as a part of the tooling for the new design. Thus the blue color served the very

Jig for Main Assembly Radio Room Pick-Up



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PRODUCTION EFFICIENCY

wherever

THE SUPER SERVICE UPRIGHT

Dominates

THE UPRIGHT DRILLING DEPARTMENT



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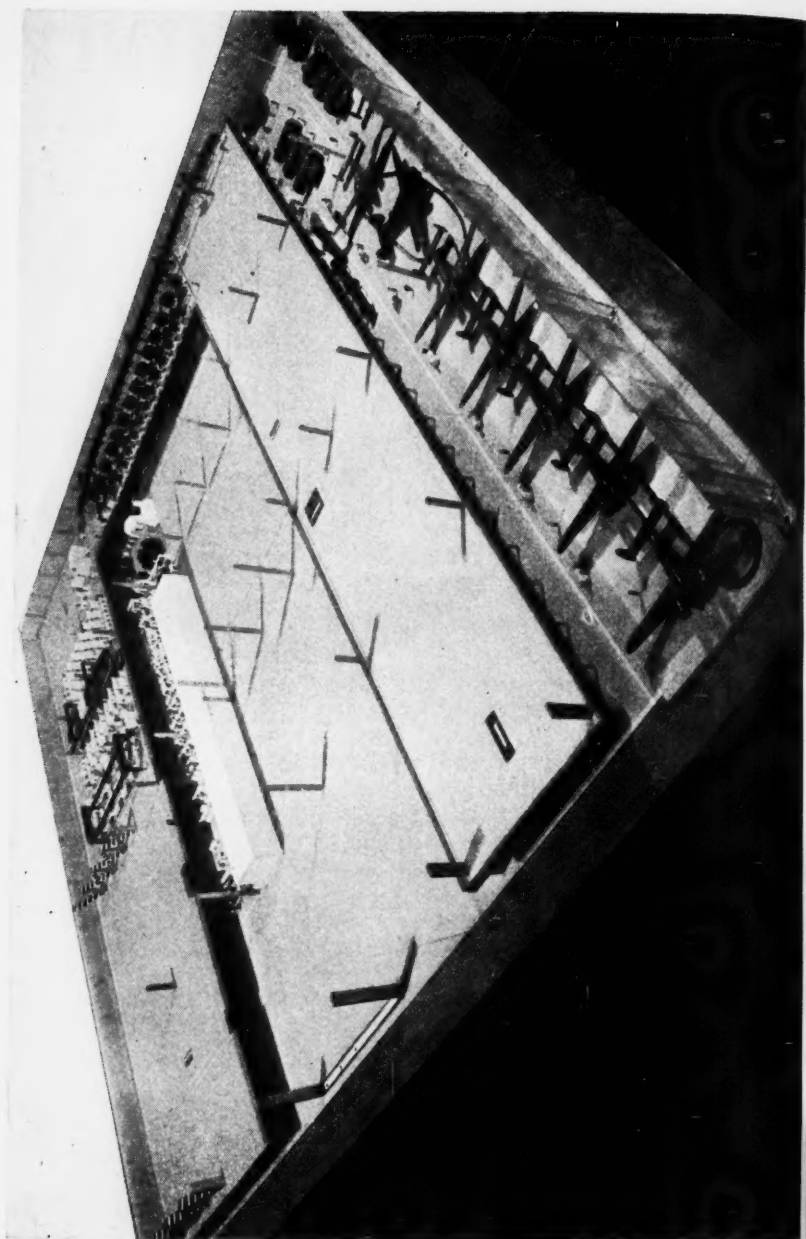
1. Spindle and feed changes all controlled by a single lever.
2. Direct reading speed and feed plates.
3. Spindle and feed changes obtained through sliding gears.
4. Multiple splined integral key construction.
5. Heat treated alloy steel gears with ground teeth.
6. Non-friction, ball and roller type bearing construction.
7. Automatic lubrication throughout.
8. Positive type clutch for feed engagement, eliminating drop worm construction or disengaging gears.
9. Automatic adjustable feed trip and safety trips at top and bottom of spindle travel.
10. Direct connected driving motor with convenient, close coupled mounting.



If you are interested in catalogues pertaining to any of the SUPER SERVICE line of metal drilling machines, do not hesitate to write us.



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OAKLEY, CINCINNATI, OHIO, UNITED STATES OF AMERICA

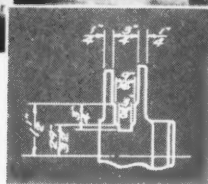
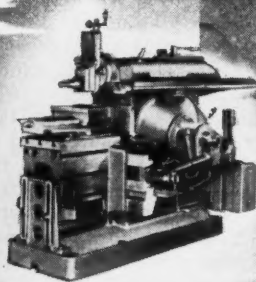


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Production

A surprising number of Cincinnati Shapers are on production jobs—they have stepped out of the tool room into the manufacturing shop... Here is a typical example of a Heavy Duty Cincinnati Shaper, using a simple fixture and forming tool, producing with economy and efficiency... There may be a spot in your shop where a Heavy Duty Cincinnati Shaper can be used with profit.

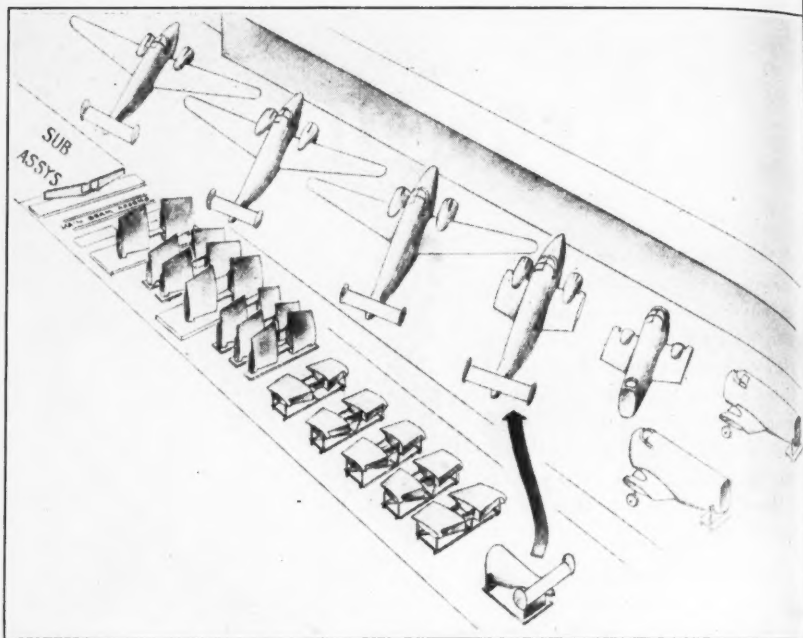
*Write for our complete
Catalog No. N-2.*



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Final Assembly Preliminary Production Line

practical purpose of keeping the tools designed for this task from straying off the job.

After the equipment layout had finally been approved, the exact position allotted for each machine or other piece of stationary equipment was indicated on the floor by painting the layout on the floor with green paint; thus the millwrights could set a machine in the exact position planned for it without further instructions.

At this point in the process a fourth crew of production processors was established. It became the duty of these men to (1) police the preliminary line areas, (2) order necessary equipment, benches, and utilities that might have been overlooked in the original planning, (3) direct the placement of all equipment, and (4) maintain uniformity of layout,

color scheme, and general planning. It also became their duty to re-plan the preliminary planning on material handling equipment and material flow, as the preliminary line developed, and to solve such problems as had been impossible of solution in the preliminary planning.

As this article is written, the preliminary production line is in operation and the "wash-out" of the old model and the "wash-in" of the new model from the preliminary line into the production line will be made as planned and scheduled.

The responsibility for building the ship and getting it into production will be relinquished by the New Modification Departments as soon as all the work of the Manufacturing Engineering Department has been proved.

THE FIRST 25 YEARS



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The suggestion is made that, insofar as is practicable, your postwar planning be started early. Ex-Cell-O's many facilities are at your disposal.

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An Ex-Cell-O 25th Anniversary Book, illustrated above, has just been printed. If you would like a copy just write to Ex-Cell-O Corporation, 1200 Oakman Boulevard, Detroit 6, Michigan.

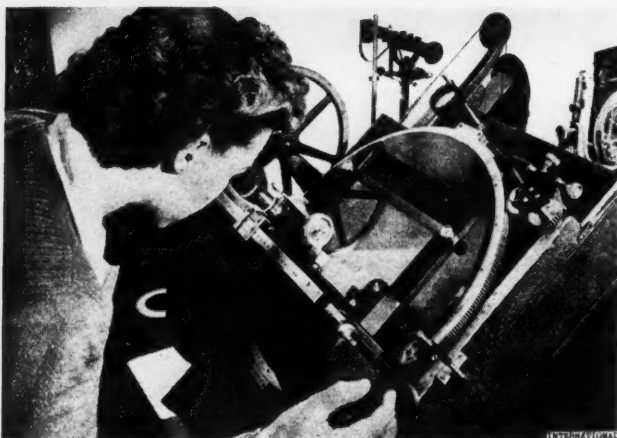
Ex-Cell-O "Firsts"

EX-CELL-O was the first company in the United States to design and manufacture and introduce for successful commercial use...

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- ...a 1½ horsepower compact hydraulic power unit
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- ...a machine to form and fill automatically square paper milk bottles in the dairy

EX-CELL-O was also the first American company to undertake the mass production of hardened and ground precision parts for aircraft engines.

Precision MACHINE TOOLS • CUTTING
TOOLS • AIRCRAFT AND MISCELLANEOUS PARTS



Many Industries Have
Already Switched to
Metric—and Found
Saves Time, Money
and Headaches



Let's Go Metric!

Most mechanical engineers and tool manufacturers agree that the metric system of measurement should be and ultimately will be adopted, but the adoption has been put off because of the confusion that appears inevitable. Now, when practically all regular production has been suspended, is the logical time to make the change

J. D. RATCLIFF

Editor of "Science Yearbook of 1944"

ASK your neighbor to define a troy ounce, a gill, a furlong or a drachma. His failure to answer correctly is no reflection on him. It is a reflection on the absurdity of our system of weights and measures.

It is a perfectly safe bet that **no** one in the United States can accurately define all the units in the system: the grains, scruples, pennyweights, the three kinds of tons, the 56 kinds of bushels. The Bureau of

Standards uses over 500 fine-type pages to do the job.

The ancient Chinese had an "up-hill" mile and a downhill" mile. They logically contended that it was harder to walk up a hill than down, and that the uphill mile should be shorter. Smile if you will—but look at our system. Ask the old question: which is heavier, a pound of gold or a pound of feathers?

Silly, you may say. But wait a

industries have
Switched
and Found
Time, Money
Headaches

moment. Feathers
are weighed by
voirdupois, gold
by troy. The
voirdupois pound
is 7,000 grains;
the troy, 5,760
grains. Therefore,
unless you define
the items involved
carefully, a pound
of feathers weighs
very much more
than a pound of
gold.

There is one
way out of this
horse-and-buggy
system of weights
and measures:
join the world pa-
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the metric system.
It is the only
scientific system.
It has been adopt-
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except Great Bri-
tain and our-
selves. Every
country south of
the Rio Grande
uses it. So does all
of Europe and the
Orient—including
"backward"

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ever gone back to
its old system.
look at
question: decimal system we use in money—
gold or
wait a
there is no need for fractions.

HOW THE METRIC SYSTEM WORKS

METRIC SYSTEM



TO CONVERT UNITS
JUST MOVE
THE DECIMAL POINT

161 CENTIMETERS =
16.1 DECIMETERS =
1.61 METERS

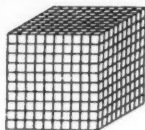
OUR SYSTEM



TO CONVERT UNITS
YOU MUST
MULTIPLY OR DIVIDE

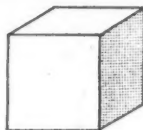
161 INCHES =
13 5/12 FEET =
4 17/36 YARDS

PROBLEM: FIGURING COST



if
1 METRIC TON
(1000 KILOGRAMS) COSTS \$160,000
then
1 KILOGRAM COSTS
ONE THOUSANDTH \$160
and
1 GRAM COSTS
ONE THOUSANDTH AGAIN 16¢

PROBLEM: FIGURING COST



if
1 LONG TON
COSTS \$160,000
then
1 POUND COSTS
1/2240TH \$71.43
and
1 OUNCE COSTS
1/16TH AGAIN \$4.46

TERMS FREQUENTLY USED

LENGTH

(UNIT: METER)

1 Kilometer = 1000. Meters
1 Decimeter = .1 Meter
1 Centimeter = .01 Meter
1 Millimeter = .001 Meter

WEIGHT

(UNIT: KILOGRAM)

1 Metric Ton = 1000. Kilograms
1 Quintal = 100. Kilograms
1 Gram = .001 Kilogram

VOLUME

(UNIT: LITER)

1 Hectoliter = 100 Liters

APPROXIMATE EQUIVALENTS

1 METER = 1 YARD (39.37 INCHES)

1 KILOGRAM = 2 POUNDS (2.2 LBS.)

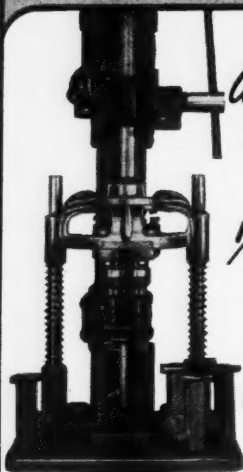
1 LITER = 1 QUART (1.06 LIQUID QUARTS)

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Centers
from
1/2" to 6"*

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change to metric is one of the small jobs which should get top priority. Millions of soldiers will be returning from overseas where they have become accustomed to kilometers, meters, liters. Thousands of factories will have to be retooled for peace—they may as well be retooled in metric.

We're Born on Metric

Of their own volition, a great many industries have already switched over. Almost the entire chemical industry is based on metric measurements. Because of the great saving of time and of wear and tear on brains, many machinery companies and manufacturers use metric exclusively. We buy vitamins by metric weight, tune our radios to meter waves and follow sports events where metric measurements are used. For the sake of simplicity, safety and convenience, physicians write prescriptions in metric. We even enter the world on the metric system—nearly all hospitals weigh newborn infants in terms of grams.

Our decimal monetary system is the essence of simplicity. We recognize the contrasting awkwardness of the British monetary system—yet we cling to a system of weights and measures which is even more archaic. To appreciate the beautiful simplicity of metric measurements, consult your child's arithmetic book.

Look at this sample problem: Find the number of cubic yards in a room which measures 7 yards 14 inches, by 12 yards 23 inches, by 4 yards 8 inches.

Contrast this with the same problem in a French, Chilean or Russian textbook: Find the number of cubic meters in a room which measures

GIVING A MACHINE THE BREATH OF LIFE

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yards

HERE you see the spider of a reverse gear unit getting a fine finish while being rotated on a vertical milling machine. It is one of the many cases where only the combination of trained mind, skilled hands and the *right file* can provide the final touch that means good performance. No single type of tool has yet been discovered which can be applied with greater versatility toward "making things work" than files. Their designing and production constitute an "industrial art" which can still be a tool manufacturer's sole business. For 80 years, Nicholson has been making files and nothing else. Much of today's improved file-cutting machinery is Nicholson-designed. Nicholson devotes its field studies wholly to the application of



Photo courtesy Fawick Airflex Co.

files—in industrial production, in sharpening tools and implements, in working different kinds of metals, alloys and other materials.

When seeking files for specific purposes, you can be sure that in Nicholson or Black Diamond brands you can obtain exactly *The right file for the job*—under the quality guarantee of *Twelve perfect files in every dozen*.

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me prob
Russian
of cubic
measures

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U.S.A.
MADE IN U. S. A.

11.42 meters by 5.25 meters by 3.9 meters. A clock would be needed to measure the amount of time consumed with the first problem; a stop watch with the second.

Take another problem. Convert 11 pints, 2 gills into gallons. That takes time. But to convert 6,479 centimeters into liters one needs only to place a decimal point—6.479 liters. This speed and accuracy endear metric to all scientific men and engineers. Without exception, they are for the change-over—and the sooner the better.

Educators estimate that the metric system, by eliminating fractions, would save at least a year of time spent by children learning arithmetic. For industry, the savings in dollars would be even more dramatic. One factory which switched to metric estimated in one year it saved 10

times the cost of new measuring devices. A railroad estimates metric would save it \$50,000 a year in paper work.

Adoption of metric would put everything on one standard, and eliminate confusion that exists in many places—the Army, for example. The Army uses four measures of gun sizes: inches for coast artillery; millimeters for field guns, calibers for rifles and machine guns; gauges for shotguns.

To a large extent, we cling to our present system purely because of inertia. Examine some of its absurdities. The foot, for example, was originally anyone's foot—without regard to shoe size. Edward II decreed that three barleycorns made an inch: and Henry I specified the yard as the distance from the tip of the royal nose to the tip of the royal



FISCHER *Oil Groovers*

A wide variety of grooves may be cut on the "FISCHER" . . . with minimum set-up time and cost.

Bearing in which groove is to be cut is mounted on revolving chuck secured on work spindle. Boring tool is secured to carriage slide which has a reciprocating motion timed with work spindle and lined by crank gear and connecting rod.

Several attachments can be furnished for cutting practically any type of oil groove.

Capacity of No. 1 Machine—5" dia. . . . No. 2 Machine—15" dia.

PROMPT DELIVERIES
Write for catalog.

FISCHER MACHINE CO.
310-16 N. ELEVENTH ST. PHILADELPHIA, PA.

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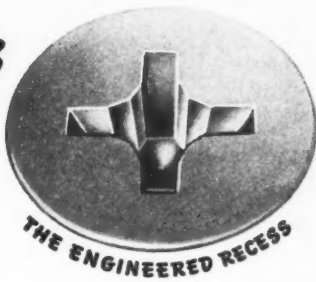
MAKE THIS TEST

AND SEE WHY **90% OF ALL**

RECESSED HEAD SCREWS

HAVE THE SAME RECESS

IT'S PHILLIPS



There's nothing like making the *driving test* to convince yourself that there's nothing to match the all-around superiority of the recess design in Phillips Screws! It quickly demonstrates that Phillips is truly a scientifically *engineered* recess in which every angle, every dimension has a definite purpose, contributing to driving ease and speed—and to fastening strength.

Once you make this "driving test" you'll see how Phillips Recess Head Screws fully utilize turning power . . . why your workers can "get going" without fumbling, wobbling, skidding starts . . . can sustain speed and make *consistently* tight fastenings without getting all tuckered out.

That's because the driver point *automatically* centers itself in the Phillips Recess, so that screw and driver "handle" like one unit!

You'll also discover that you can set screws up tight without danger of wrecking the Phillips Recess. Those *rounded* corners of the Phillips design will not crush under pressure. And that rugged screw head won't pop off, either, because the Phillips Recess does not weaken it!

The driving test also explains why the Phillips Recess is found in 90 per cent of all assemblies where recessed head screws are used . . . and why Phillips is the only recess ever ok'd by 23 leading screw makers!

To Make Wartime Quotas and Peacetime Profits . . . get the faster starting — faster driving — stronger, better looking fastenings that only screws with Phillips Recess Head can give you!

PHILLIPS *Recessed Head* SCREWS



IDENTIFY IT!

Center corners of Phillips Recess are rounded . . . NOT square.



Bottom of Phillips Recess is nearly flat . . . NOT tapered to a sharp point.

WOOD SCREWS • MACHINE SCREWS • SELF TAPPING SCREWS • STOVE BOLTS

23 SOURCES

American Screw Co., Providence, R. I.
Atlantic Screw Works, Hartford, Conn.
The Bristol Co., Waterbury, Conn.
Central Screw Co., Chicago, Ill.
Chandler Products Corp., Cleveland, Ohio
Continental Screw Co., New Bedford, Mass.
The Corbin Screw Corp., New Britain, Conn.
General Screw Mfg. Co., Chicago, Ill.

The H. M. Harper Co., Chicago, Ill.
International Screw Co., Detroit, Mich.
The Lamson & Sessions Co., Cleveland, Ohio
Manufacturers Screw Products, Chicago, Ill.
Millard River and Machine Co., Millard, Conn.
The National Screw & Mfg. Co., Cleveland, Ohio
New England Screw Co., Keene, N. H.
Parson-Raton Corp., New York, N. Y.

Pawtucket Screw Co., Pawtucket, R. I.
Phelan Manufacturing Co., Chicago, Ill.
Reading Screw Co., Norwalk, Pa.
Russell Burdett & Ward Bell & Neil Co., Port Chester, N. Y.
Seavill Manufacturing Co., Waterville, Conn.
Shelsworth Inc., Chicago, Ill.
The Southington Hardware Mfg. Co., Southampton, Conn.

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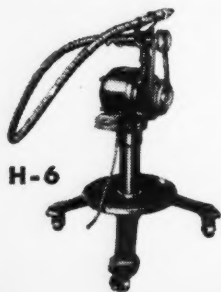
July, 1944



SAVE *Critical* **TIME!**

TIME CANNOT BE SALVAGED

Once it's gone there's no reclaiming it. But you can cut your finishing time 'way down with Haskins Flexible Shaft Equipment. Forget old hand-finishing methods. Your men will work faster and better, with less fatigue, the Haskins way. Every hour will see increased production. Man-hours—plus machine-hours will really mean something. For important new time-saver methods, send for your copy of Catalog 45. R. G. Haskins Company, 619 So. California Avenue, Chicago, Ill.



H-6



haskins

FLEXIBLE SHAFT EQUIPMENT

right thumb. The rod was the sum of 16 left feet placed heel to toe, the left feet being supplied by the first 16 men who emerged from church on Sunday. Thus, our hopeless patchwork of measurements sprang up.

Metric System Would End Confusion

The metric system was devised to end all this confusion—by arriving at a minimum number of units, and placing all these units on the decimal system. During the French Revolution the National Assembly appointed a commission of scientists to do the job. The French scientists arbitrarily decided that the basic unit of measurement should be the meter, which was one ten-millionth of the distance from the Equator to the North Pole. The meter turned out to be the rough equivalent of our yard—39.37 inches. Like our dollar, the meter was divided into 100 equal parts—centimeters. It was multiplied by 1,000 to make the kilometer—which is about three-fifths of our mile. Thus, instead of saying that it is so many miles, so many feet and so many inches from one point to another, the metric system expresses the distance in decimals—4.56 kilometers. The metric measure of land area is the hectare—10,000 square meters, roughly two and a half acres.

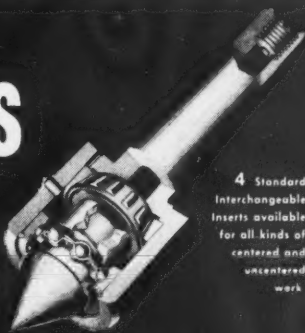
The weight of one cubic centimeter of pure water became the basic measure of weight—one gram. One thousand grams composed a kilogram—2.2 pounds. One thousand cubic centimeters became the liter—slightly more than our quart. Thus, metric has three basic units: liter, gram, meter. Everything else is either a subdivision or a multiple of these units. They are convertible, one to the other. Thus 1,000 cubic centime-

TURN ~~FASTER!~~ CUT DEEPER!

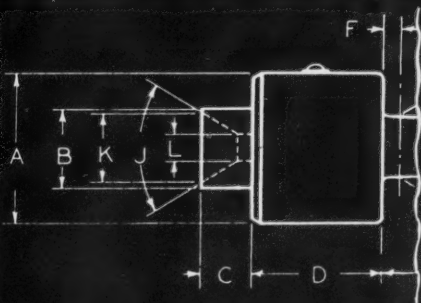
with IDEAL LIVE CENTERS

Turn Heavier Loads—Make Deeper Cuts
at Higher Speeds

—with Ideal Live Centers because they rotate with the work. Turn out more work in less time, on lathes, millers, grinders, etc. Built with precision ball and tapered roller bearings. Centers with Morse Tapers carried in stock.



4 Standard Interchangeable Inserts available for all kinds of centered and uncentered work



4 INTERCHANGEABLE INSERTS

MALE INSERT—For work already centered.

PLAIN FEMALE INSERT—For uncentered work, drills, shafts, etc.

FEMALE INSERT WITH LANDS—For uncentered work having flat, or burred keyway.

PIPE INSERT—For handling pipes, large tubes, etc.

ELECTRIC TACHOMETER

Checks RPM instantly. Used as "Hand Type" or, with generator separated from meter, as "Separable Type." Two sizes—0 to 2500 RPM and 0 to 5000 RPM.

DEMAGNETIZER

A single pass across the Demagnetizer removes metallic dust, flakes and fine chips, etc. Keep tools sharp longer. Powerful—portable. Two sizes.

FREE . . . Machine Tool Accessories Catalog
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IDEAL Sycamore

★ IDEAL COMMUTATOR DRESSER CO ★

1031 Park Avenue

Sycamore, Illinois

July, 1944

MODERN MACHINE SHOP 147

KIPP *Air* Grinder



Illustration
Approximately
 $\frac{1}{2}$ Size

\$29⁷⁵ Model H

**IF YOU ARE DOING
PRIORITY WORK,**

Order Today!

Every toolmaker, every tool crib, every machine shop and thousands of production jobs need a model H Kipp Air Grinder. Because of expanded facilities the delivery position on high ratings has been measurably improved. Accessories in reasonable quantities can usually be shipped out of stock. Madison-Kipp Air Grinders were developed by practicing tool makers so they are practical. They usually pay for themselves on a single job.

MADISON-KIPP CORP.

208 WAUBESA ST., MADISON 4, WIS.

ters make a liter; a liter of pure water weighs a kilogram.

One prominent educator declares that he can teach metric to any reasonably intelligent person in less than an hour.

More and more our engineers are going to foreign countries to build railroads, power plants, bridges. Often, when they accept these jobs, they fear they will have difficulty in dealing with new units of measurement. To a man, they report no difficulty whatsoever. Their calculations are simplified immeasurably, and they come home ardent metric fans.

Adoption of the metric system would give this country a tremendous advantage in world trade. Our salesmen would go into foreign countries speaking a familiar language of weights and measures.

Japan and Germany, both on metric, had a trade advantage in South America in pre-war days and walked away with a large share of the market. If we discard our clumsy system and get into step with the rest of the world, this advantage will be ours.

In the interest of hemisphere security, and thus national security, our government is doing everything possible to establish closer relations with the Latin-American countries. Further, we are all looking forward to closer business relationships with our friends to the South in the interest of national prosperity. The entire Western Hemisphere south of the Rio Grande uses the metric system of measurement. Everything we sell to these countries must be made to metric measurements. It would be logical for all of us in this hemisphere to use the same system—and to use the simplest, which is the metric.

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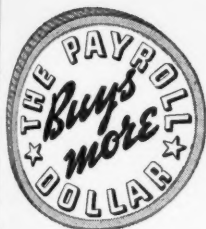
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**THE PAYROLL
DOLLAR**
buys more



...WHEN "AMERICAN" MULTI-PRODUCTION LATHES ARE USED

HERE, for example, is an "American" in one of our most prominent shops actually producing four (4) times more work than the fairly modern machine it replaced. In hundreds of plants "American" Multi-Production Lathes are lightening the burden of higher wages, shorter hours, increased taxes and inexperienced operators. That is why "Americans" are the choice of cost-minded production men. The many productive features responsible for such results are clearly illustrated and described by our new bulletin No. 445

THE AMERICAN TOOL WORKS COMPANY
LATHES • RADIALS • SHAPERS
CINCINNATI, OHIO, U. S. A.

What about Great Britain? It has long been obvious that if we were to switch, Britain would have to—it couldn't remain isolated in the world. Similarly, if Britain changed to metric we would have to follow. So it's a question as to who will make the first move.

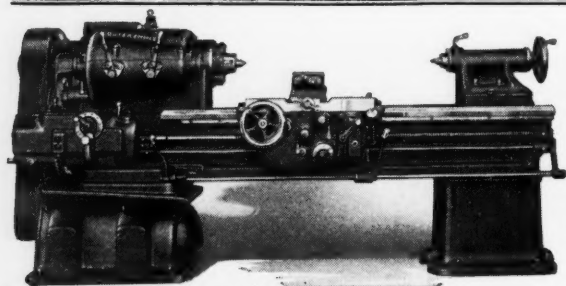
Exactly how difficult would the change-over be? Since there are but three basic units in the metric system, the average person should be able to adjust himself in a few days' time. We would have to learn to think of auto speeds in terms of kilometers per hour, instead of miles per hour. But the general similarity of other units would ease the task. The liter is close to our quart. Half a kilogram is near to our pound.

Why, then, haven't we changed—long ago? Congress legalized the metric system in 1886. But this act

only made its use permissible. We long ago decided that metric should be used in Hawaii, the Philippines and Puerto Rico—but have resisted efforts to avail ourselves of its advantages at home. Several times Congress has considered bills which would make use of metric compulsory. The last time was 1926.

A small but vocal minority opposed the bill. It gave voice to a widespread misconception—that all machinery would have to be scrapped. This, of course, isn't true. Only the names of things are changed.

Road signs, railway mile posts, scales, rulers, calipers would have to be changed. The bill of 1926 proposed that a 10-year period be allowed for such changes. Other countries have done this without suffering hardship. In this time large amounts of old equipment would have



Engine Lathes

THE BOYE & EMMES MACHINE TOOL CO. CINCINNATI OHIO

BIRMINGHAM.....Pratt & Whitney Co.
BOSTON.....Pratt & Whitney Co.
CHARLESTON, W. VA.,
The McJunkin Supply Co., Inc.
CHICAGO.....P. P. Wagener, Wilmette
CINCINNATI.....Pratt & Whitney Co.
CLEVELAND.....Pratt & Whitney Co.
DETROIT.....D. E. Morand Machinery Co.
DULUTH.....W. P. & R. S. Mars Co.
GRAND RAPIDS.....Joseph Monahan
HARTFORD.....Pratt & Whitney Co.

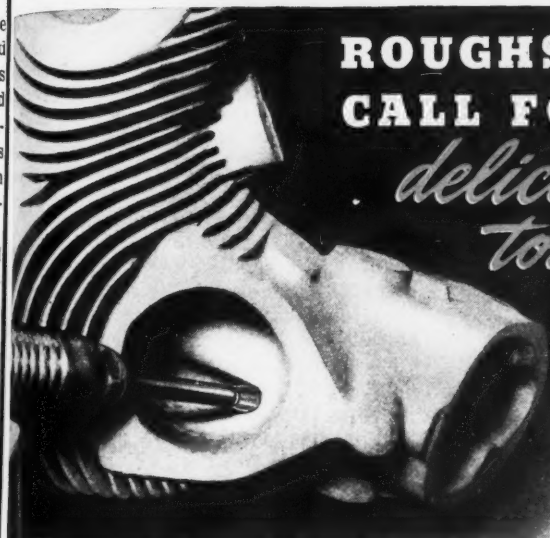
HOUSTON.....Huge-Fayle Supply Co.
MILWAUKEE.....Nichol Machinery Co.
NEW ORLEANS. Woodward, Wight & Co., Ltd.
NEW YORK CITY.....Pratt & Whitney Co.
PHILADELPHIA.....Pratt & Whitney Co.
PITTSBURGH.....Rees Machinery Co.
RICHMOND.....D. B. Parker
ROCHESTER.....Pratt & Whitney Co.
ST. LOUIS.....Pratt & Whitney Co.
SEATTLE.....Buckner-Weatherby Co., Inc.
TOLEDO.....Frank D. Lake Co.

Canadian Representative: Moore Bros. Mach'y Co., Ltd., Montreal

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ROUGHS THAT CALL FOR

*delicate
touch*



Seems a paradox? But watch RFC HAND-CUT ROTARY FILES, like this one, on certain rough forming jobs. Cutting swiftly, surely . . . with the delicate precision of an expensive formed milling cutter.

Then turn to the RFC rotary files that—with the same precision and speed—are smoothly forming radii to exacting lines and dimensions, or sharply defining tight corners.

After 20 years of pioneering in rotary file applications throughout industry, RFC takes especial pride in every new production speed record that RFC rotary files establish on vital War tasks.

What's your own "slow-time" problem? You may find the remedy in the new RFC Catalog or in RFC special service.



**The ROTARY
FILE COMPANY**
STRATFORD, CONN.



The open front and back design of the No. 9AMP permits work to be quickly and easily inserted into and removed from the machine. Round parts to be marked are placed on cradle roll and flat die passed over them, producing the desired markings. For large parts that have to be lifted to and from the machine, a handy clutch lever is used to control the marking head for each marking stroke.

The cast iron head that holds the adjustable steel slide carrying the type and die holder slides on a heavy steel shaft. All moving parts of the machine are bronze bushed or are cast iron against steel, and are fully guarded with the exception of the marking head which is left clear for access to the work area.

The Acromark No. 9AMP Marking Machine is 46 inches high overall, 25 inches deep overall, and 36 inches wide.

"Sav-Way Spitfire" Electro-Hydraulic Internal Grinder

Said to be the first internal grinder to utilize the combination of hydraulic operation and electro control, the "Sav-

Way Spitfire" Electro-Hydraulic Internal Grinder illustrated herewith has been brought out by Sav-Way Industries, Box 117, Harper Station, Detroit 13, Mich. Outstanding features include a short table stroke (5/32-inch minimum) and an extremely rapid table feed and reverse which combine to afford the machine unusual speed on short work. Solenoid-operated valves and aircraft type micro-limit switches provide for constant control and reduce time lag to a minimum.

In addition to electro-hydraulic control, the Sav-Way Spitfire is also equipped for hand table feed—a time-saving convenience when setting up. The hand feed is engaged by moving handwheel out to engage a rack and pinion. To disengage the hand feed, the handwheel is pushed in.

The Spitfire Grinder is available with either manually or electrically controlled power cross feed. The electric cross feed provides a cross-slide ratchet feed of 0.0001 inch per tooth, resulting in 0.0002-inch increase in the diameter of the hole. The cross-slide handwheel is graduated to 0.000125 inch.

The standard machine is equipped

Rawhide

PROTECTS

The tough, resilient, coiled rawhide faces of C/R Hammers and Mallets strike effective blows without battering or marring... protects finished surfaces, machines delicate insulation and parts. Speed die-setting, assembly, no fatiguing re-coil. Reduce breakage and spoilage. Sizes and weights for every need.

C/R Hammers have permanent malleable iron heads which take replaceable insert faces of coiled mechanical rawhide.

CHICAGO *Rawhide* MFG. CO.
1201 ELSTON AVE. ★ CHICAGO, ILLINOIS

**IMMEDIATE
STOCK SHIPMENTS
ON MOST TYPES**

BEFORE YOU ORDER WELDING ELECTRODES *consult Westinghouse*

Westinghouse is pleased to announce greatly improved deliveries on electrodes . . . immediate stock shipment on most types.

Among those immediately available is the new ACP electrode which is definitely superior for all-position a-c or d-c reverse-polarity work. While this electrode has been in production and use for considerable time, its announcement to the trade has been withheld pending the building up of present substantial stocks. (See current trade papers for formal announcement.)

Also available for shipment now is the famous DH electrode for high-speed, horizontal fillet and flat welds where high quality is essential. Likewise ready for quick delivery are standard AP (d-c) and FP (a-c or d-c) electrodes.

Wire or phone your nearest Westinghouse office for complete details and definite shipping data. Westinghouse Electric & Manufacturing Company, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-90536A



WESTINGHOUSE PRESENTS—JOHN CHARLES THOMAS—SUN, 2:30 E. W. T., N. B. C.—“TOP OF THE EVENING”—
MON. WED. FRI. 10:15 E. W. T. BLUE NETWORK

Westinghouse
PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

WELDERS • ELECTRODES AND ACCESSORIES

MODERN MACHINE SHOP 251

July, 1944



"Sav-Way Spitfire" Electro-Hydraulic Internal Grinder

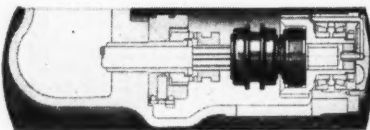
with a manually operated wheel-truing mechanism with cam return. However, the Spitfire is also available with an electrically operated diamond wheel

dresser with automatic, adjustable slowdown of table traverse while dressing the wheel. This automatic dresser is protected by a suitable mechanism to prevent damage to the machine through mis-operation.

The Sav-Way Spitfire Grinder is equipped with a spindle having a unique self-ventilating feature which provides for a constant flow of oil-mist through the working parts of the spindle and also keeps the spindle free from dirt and coolant. The spindle is driven by a 3 h. p., 3,600 r. p. m., dynamically balanced, totally enclosed, fan cooled, ball-bearing motor. The workhead spindle is driven by a $\frac{1}{2}$ h. p., 1,140 r. p. m., dynamically balanced, ball-bearing motor which is completely enclosed. Workhead spindle speeds of 90, 145, 235, and 365 r. p. m. are provided through an ad-

How PULLMORE CLUTCHES Operate Both Rapid Traverse and Feed

This single type PULLMORE Multiple Disc CLUTCH application operates the rapid traverse through the PULLMORE clutch and the feed through a jaw clutch — both by means of one shifting lever. If your products can be improved by applying similarly efficient power transmission control, our engineers will be glad to explain the benefits of utilizing PULLMORE advantages.



SEND FOR THESE POWER TRANSMISSION CONTROL BULLETINS

Show helpful application diagrams. Give capacities, dimensions and specifications. Describe and show space, time, labor and money saving features of Pullmore Clutches



Rockford Drilling Machine Division

Borg-Warner Corporation

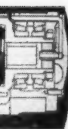
1309 Eighteenth Ave., Rockford, Illinois, U.S.A.

USE ROCKFORD INDUSTRIAL CLUTCHES FOR SUPERIOR PERFORMANCE AND ECONOMY						
Machine Tools	Process Machinery	Farm Implements	Materials Handling	Earth Movers	Service Machinery	Power Units
Pullmore Multiple-Disc Clutches • Over-Center and Spring-Loaded Clutches • Power Take-Offs						

Electro-Hydraulic
Pump

ic, adjustable tra-
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Power Units



Take-Offs

July, 1944

FIRST OPERATION

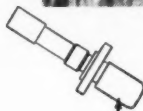
Operation	Spindle R. P. M.	Surface Feet P. M.	Depth of Cut	Feed per Rev. Inches	Tools
1st Box Tool Form	2000	165	.003	.003	Brush H. S. Steel Carbide No. 803
2nd Box Tool	2000	200	.00075	.001	
Cutoff	2000	165		.002	H. S. Steel

MATERIAL: 5/16" rounds of "R" MONEL.

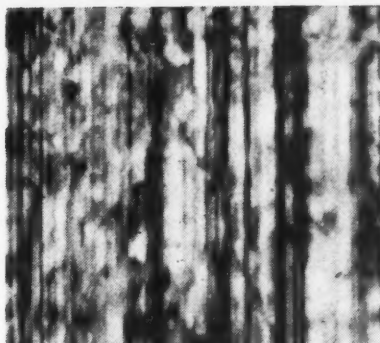
MACHINES: Brown & Sharpe Automatic Screw
Machines, 00G.

LIFE OF TOOLS: 8 to 12 hours.

CUTTING LUBRICANT: Texas Oil Co., Cleartex "B".



Approximate location
of surface shown in
micro-photograph.

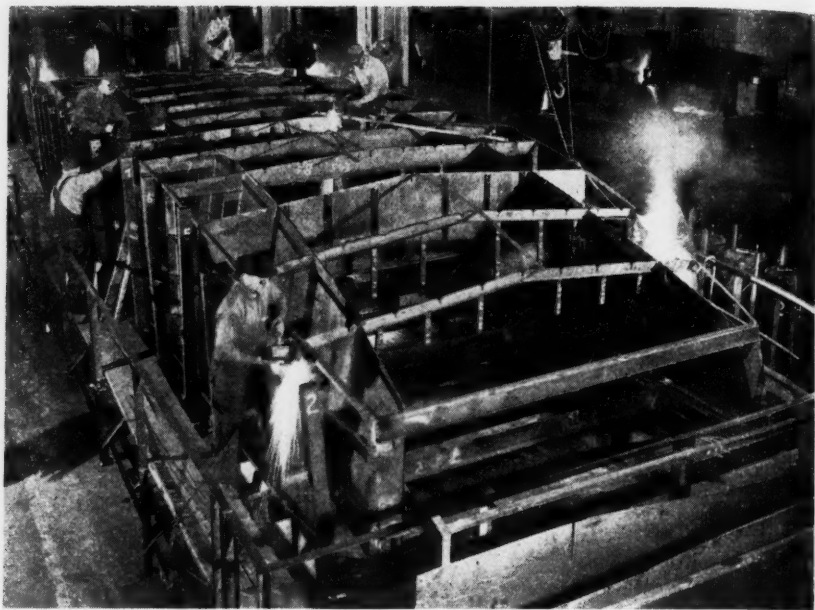


"R" MONEL MACHINED
SHANK, MAGNIFIED
1000 TIMES. Good sur-
face finish on this piece
is indicated by a Brush
Surface Analysis of 9.2
micro-inches.

Write for INCO Technical Bulletin T-12, "Machining".

THE INTERNATIONAL NICKEL COMPANY, INC.

67 Wall Street, New York 5, N. Y.



Building LCM-3 Landing Barges at the Warren, Ohio, Plant of the Warren City Manufacturing Company. Each Barge is 50 Feet Long, 14 Feet Wide, and Weighs Approximately 25 Tons. Power is Provided by Diesel Engines

Building LCM-3 Landing Barges

Mechanized landing craft built and tested under actual sea conditions hundreds of miles from salt water

A DRY-LAND shipyard at Warren, Ohio, is producing mechanized landing craft for the Navy and launching them in a 34,000-gallon inland "ocean" many hundreds of miles from the salt water in which they ultimately will operate.

The barges are the LCM-3 (Land-

ing Craft Mechanized) type, each being 50 feet long, 14 feet wide, and weighing approximately 25 tons. Each barge is equipped with a Diesel engine for power, and is designed to carry one medium-size tank, personnel, and various Navy equipment.

The manufacturer is the Warren

400 an hour!

Lapointe-Vertical 5-ton.

Producing close tolerance finishes on the inside of engine bearing linings at anywhere near mass production figures was considered an impossibility until broaching was called in. Now, 400 bearings an hour can be made—reducing “breaking-in” periods and eliminating hot spot replacements.

Because of the unevenness of bearing linings broaching engineers figured a maximum and minimum cutting action and devised cutting blades to cover maximum babbitt removal. Cutting at 60 feet per minute with a 120 foot return this vertical, 5-ton, 32” stroke Lapointe Surface Broaching Machine produces a finished

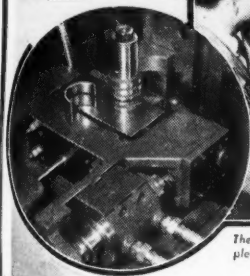
wall thickness to .0001 tolerance and is one of the fastest cycle time machines on the market. It has a special automatic fixture that makes loading and unloading easy. Each of the cutting blades removes a maximum of .010 each stroke, when maximum stock is to be removed, and are so arranged that regardless of thickness of babbitt the bearing comes out completely finished well within tolerance. It operates thus:

1. Work is put in place starting cycle.
2. Fixture moves into cutting position.
3. Machine slide completes cutting stroke.
4. Fixture returns to out stop.
5. Main slide returns ready for next cycle.

It's the machine, the broach and the unsung design engineers who made this pertinent contribution to production.

The finished work—completed stroke.

Inserting work at start of cycle.



The **LAPOINTE** Machine Tool Company
HUDSON, MASSACHUSETTS, U. S. A.

THE WORLD'S OLDEST AND LARGEST MANUFACTURERS OF BROACHES AND BROACHING MACHINES

manufacturing
25 Tons.

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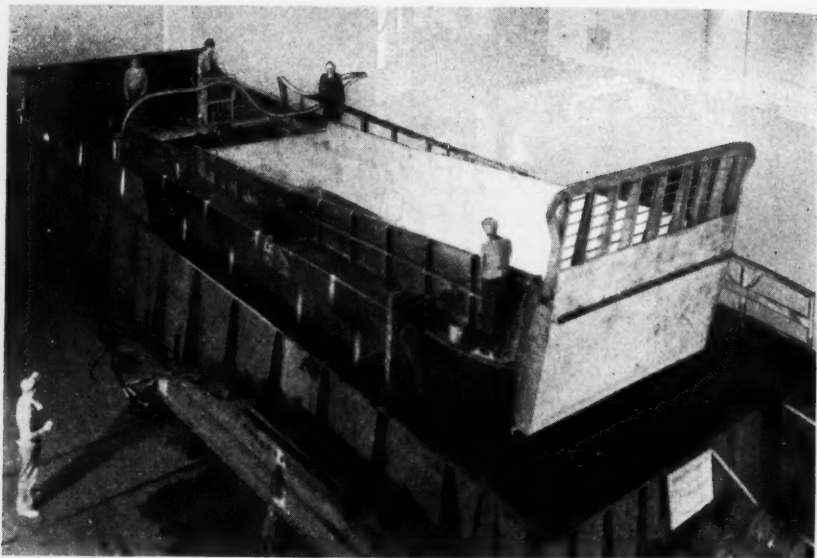
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July, 1944

MODERN MACHINE SHOP 159



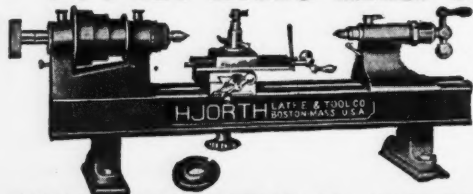
Testing an LCM-3 Landing Barge in a 34,000 Gallon Inland Ocean. The Barge is Anchored with Steel Cables to Keep It from Sailing Out of the Tank onto the Floor

City Manufacturing Company, and the manufacturing operations are carried on in one of the most complete shops for this type of work in the country. The plant is approximately 1500 feet long, with approximately 225,000 square feet of floor space. The office building is entirely air conditioned. Approximately 35 per cent of the factory and office em-

ployees are women.

The LCM-3 barges are of welded construction throughout and are constructed on an assembly line of the "progressive" type, each barge being built upside down and then turned right side up at the proper stage of construction for final fabrication and engine installation. Of sturdy construction, an LCM-3 can plow

... for more than 1001 odd jobs



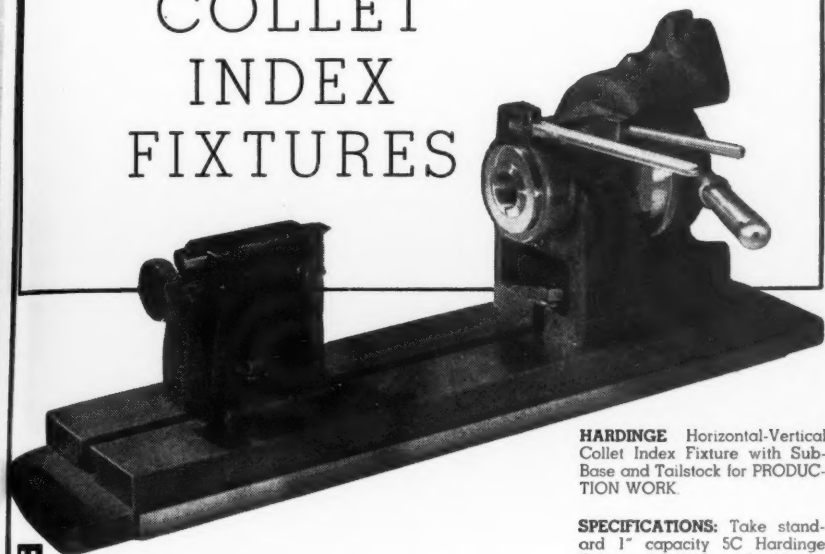
The Hjorth Bench Lathe has the speed, accuracy, handling ease, and dependability that appeals to every operator. That's why you'll find the better shops equipping with the Hjorth Lathes.

WRITE TODAY FOR DATA
AND PRICES.

HJORTH LATHE & TOOL CO., 12 BEACON ST., WOBURN, MASS.

HARDINGE

COLLET INDEX FIXTURES



HARDINGE Horizontal-Vertical Collet Index Fixture with Sub-Base and Tailstock for PRODUCTION WORK.

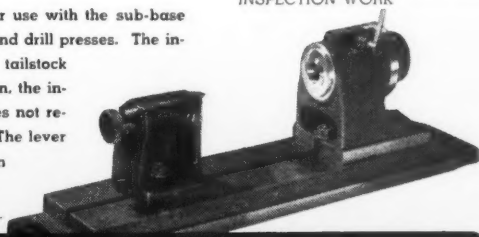
SPECIFICATIONS: Take standard 1" capacity 5C Hardinge Collets. Available with either a 20 or 24 hole hardened and ground index plate. The sub-base is $24\frac{1}{2} \times 5\frac{1}{8}$ "

HARDINGE Horizontal Collet Index Fixture with Sub-Base and Tailstock for TOOL ROOM and INSPECTION WORK

Time and again, you have experienced the need for a fixture to quickly hold work accurately and, at the same time, provide a means for indexing. **HARDINGE** Collet Index Fixtures fulfill those requirements economically and there is planned interchangeability of the various units for application to a wide variety of work.

These fixtures are for direct application or for use with the sub-base on your milling machines, grinders, shapers and drill presses. The index head shown above with sub-base and tailstock can be used in a horizontal or vertical position, the index plate has preselector screws so that holes not required for a particular job can be "blinded". The lever facilitates chucking of work on a production basis.

Ask for complete bulletin.



"PERFORMANCE HAS ESTABLISHED LEADERSHIP FOR HARDINGE"

HARDINGE BROTHERS, Inc.,

ELMIRA, N. Y.

July, 1944

MODERN MACHINE SHOP 161

ROGERS REAMERS

SINCE 1885

Adjustable
for
Wear



Use
ROGERS
Inserted
Blade
Reamers



Conserve
High
Speed
Steel

Align and concentric down to
 $\frac{5}{8}$ " diameter.

QUICK DELIVERY!

JOHN M. ROGERS TOOL CORP.
GLOUCESTER CITY NEW JERSEY

through breakers, ground on a shallow beach, and pull off again under its own power. Barges of this type have been used to good advantage in the South Pacific and in the Italian campaigns, and undoubtedly will play a leading part in invasion.

The first landing craft built in these shops required 23 days to build but a barge is completed now every 48 hours. Jigs and templets have been made for each part that goes into the construction of the craft, and as fast as the steel materials are received they are put into process. Material up to $\frac{3}{4}$ -inch thick is cut to the required sizes and shapes with power shears. Heavier steel plate, up to 4 inches thick, is cut by oxy-acetylene flame equipment, operated in conjunction with the proper templets.

After the component parts of a sub-assembly have been prepared, they are built up and welded together by the use of jigs and fixtures, ensuring uniformity and interchangeability of parts on similar products. Special work positioners, designed to handle work up to 20,000 pounds weight, facilitate welding operations. Where possible, automatic welding by the Union-Melt process is used. A high percentage of the welding operators are Navy certified, among whom are many women.

As each piece is cut to shape and size, it is marked with the proper symbol number. This number not only identifies the piece, but also indicates its position in the final assembly jig. The craft is built bottom-up, the side plates being set in position first, then the H-sections across the ends, then the cross beams and the bulkheads which divide the craft into sections so that if the bottom is damaged, only one section will be flooded.

Each cross beam has previously been punched to receive the T-sections, which extend longitudinally



REPLACE "SLOW-DOWNERS" with *Snap-ons*

On any operation an inefficient or poorly adapted tool is a time killing "slow-downer" — a wasteful drag on the speed and skill of even the best mechanic. Snap-on tools help speed up the toughest jobs in production, assembly and maintenance . . . in hundreds of foremost plants they are "standard equipment", the choice of better mechanics throughout industry. Snap-on direct-to-user tool service is available through 37 factory branches located in key production centers throughout America.

SNAP-ON TOOLS CORPORATION
8032-G 28th Avenue • Kenosha, Wisconsin

Snap-on Tools
THE CHOICE OF BETTER MECHANICS

along the bottom of the structure. As the cross beams are set in place they are welded to the side plates, and as the longitudinal T-sections are fitted into the slots provided for them in the cross beams, they are welded in place, making a solid frame for the bottom plates.

After the bottom plates have been anchored in place, the barge is turned over, bottom down, with the aid of overhead electric cranes. The Diesel engines are now lowered into place and connected with the driving mechanism. All accessory equipment and gear are fitted to the craft and it is ready for launching.

Each barge is "launched" in an inland ocean consisting of a tank which holds 34,000 gallons of water. In this tank the engines are started and the craft is put through its paces. Steel cables are attached to the craft to keep it from leaping out of the tank. Beginning slowly, the Diesels

are gradually speeded up for prolonged testing. The "sea" in the tank is whipped into white, boiling foam. The barge strains at its cables, riding up and down on the waves created by its own propellers.

Completely equipped from boat-hook to anchor and thoroughly tested, the barge is loaded on a flatcar and shipped to the point of embarkation. Inasmuch as the smallest dimension is through the beam, the barge is loaded on its side for shipment, but being 14 feet wide, it is still so high on the car that the shipping route must be carefully planned to avoid low bridges and tunnels.

Blake No. 2 "Filtaire" Portable Dust Collector is the subject of a four-page illustrated bulletin now being distributed by the Edward Blake Co., 634 Commonwealth Ave., Newton Centre 59, Mass. Copy of Bulletin No. 443 free upon request.

Speed Up LATHE PRODUCTION

with these
DIX-WILDER TOOLS

Here are two real production boosters for surprising increases in both output and accuracy.

MULTIPLE CARRIAGE STOP

• Increases efficiency of both skilled and unskilled workers—reduces scrap—increases output up to 100%—4 accurate indexed positions. Price for 9, 10, 12 inch lathes \$12.50; larger sizes in proportion.

AUTOMATIC COLLET CLOSER

• Fits lathes with $\frac{1}{4}$ " spindle hole—accommodates 1-A collets. Positive locking—ball bearing adjustment—no sleeves—no pins—no liners—rust proofed—quickly installed. Price \$50 complete. Immediate delivery, AAS priority req. on both. Send for ill. Catalog.

DISTRIBUTORS TERRITORY STILL OPEN JOBBERS



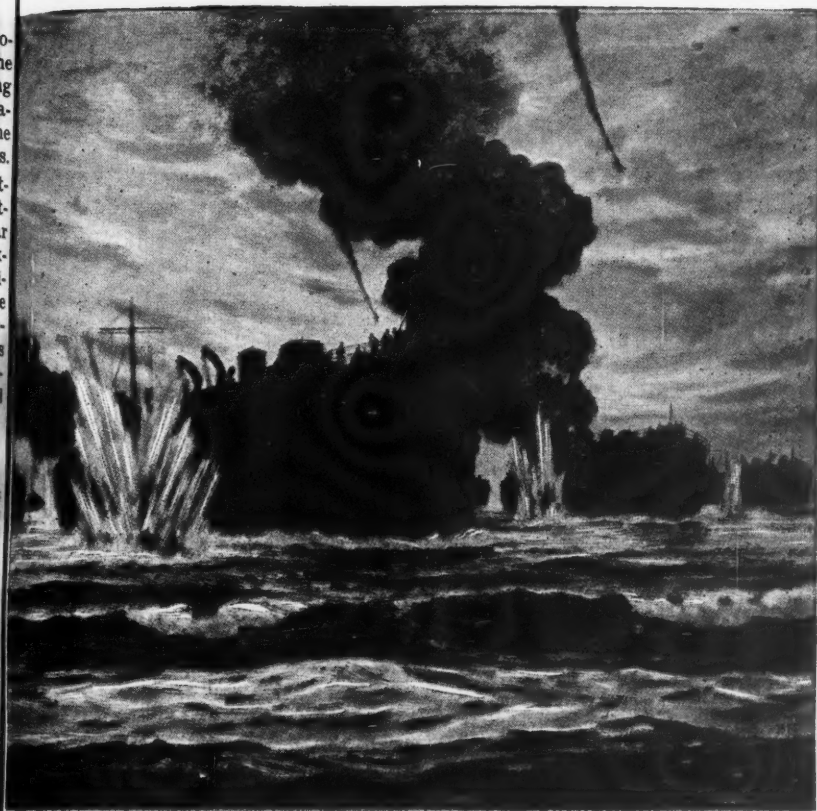
State size and make of lathe.

DIX MANUFACTURING COMPANY
3447 EAST PICO BLVD. LOS ANGELES 23, CALIF.

**PRECISION
MADE
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AVAILABLE ON REQUEST... Handsome full-color 10" x 10" reproduction of this dramatic painting of the "Green Dragons" by Lt. Commander Anton Otto Fischer, the internationally famous marine painter. No advertising.

When the Green Dragons Strike

fearfully and wonderfully made are the LST's—Land-
ing Ships, Tanks—the "Green Dragons" of the Allied
Invasion Forces. When their prows touch enemy
beaches giant jaws open and spew forth a small
mechanized army—tanks, mobile artillery, fighting
men. Another beach head is established, to have and
to hold! Aboard ship, unfailing ventilating systems
are required to remove poisonous exhaust gases of
warming up motors in the tank deck. Accordingly
every LST is equipped with high speed blowers, driven
by Star Electric Motors so powerful that two alone will
ventilate the hull, giving a wide margin of safety.
Also, aboard each LST there's a Star gear motor to
operate the elevator—to lift or lower tanks and trucks.
At sea or in industry—"in the tight spots, it's a STAR."

STAR ELECTRIC MOTOR COMPANY, Bloomfield, N. J.



STAR

MOTORS

**POWER PACKAGED
AS YOU NEED IT**



MODERN MACHINE SHOP 165

July, 1944

Then he said to himself

"THEY CAN NEVER BOMB THIS PLACE"

WITH 300 pound vehemence, Reich-Marshall Hermann Goering once impressed the heilers and the heiled in Berlin with this guarantee:

"THEY CAN NEVER BOMB THIS PLACE"

He was not trying to mislead.

Give him credit . . . he had figured it out as any business man would:

(a) He figured what his competition had

(b) He figured what he had

The answer was simple arithmetic . . . then, departing from arithmetic

(c) He *estimated* how long it would take his competition to catch up. On *that* he went completely crackpot—unalterably haywire—irretrievably "losing his market" as they say.

And that just proves again that NO ONE can estimate the regular step-ups in output made possible by enthused producers

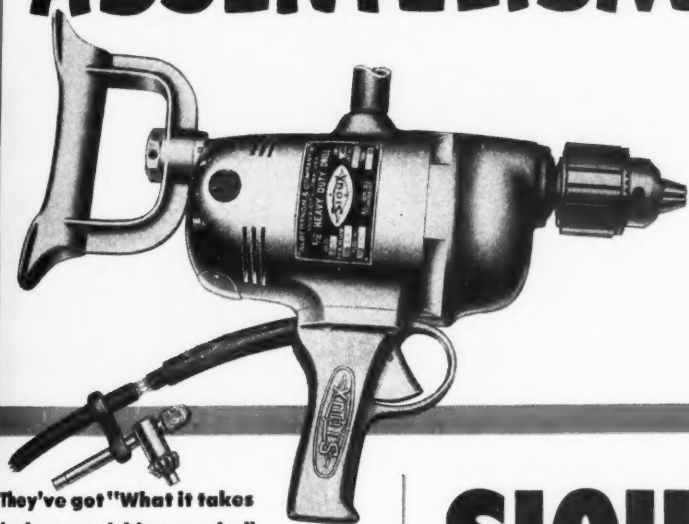
. . . having recourse to a flexible production technique

. . . that keeps improving regularly.





NO ABSENTEEISM!



**They've got "What it takes
for long punishing service"**

Designed for greater efficiency, lighter weight,
increased power, and improved handling.

A Size for Every Need

Heavy Duty 1" - $\frac{3}{4}$ " - $\frac{5}{8}$ " - $\frac{1}{2}$ " (2) - $\frac{3}{8}$ " (2) - $\frac{1}{8}$ " - $\frac{1}{4}$ "

Special $\frac{1}{4}$ " All Angle

Ask your SIOUX Distributor
or write for details.

SIOUX ELECTRIC DRILLS

STANDARD THE
ALBERTSON & CO., INC.



WORLD OVER
SIOUX CITY, IOWA, U.S.A.



When the Boys Come Home

what are you
going to do
about jobs for
employees

who return physically handicapped?

The medical director of a well-known American industry outlines the program developed by his firm for the employment of handicapped workers.

By H. A. VONACHEN, M.D.

Medical Director, Caterpillar Tractor Company, Peoria, Illinois

THE return of the physically handicapped from military to civilian life presents a problem that will test American ingenuity fully as much as the anticipated economic and political problems. Unless a well-organized program is prepared in advance, America will be faced

with the unhappy situation of disabled ex-service men being forced to wait for an opportunity to earn a living, their futures uncertain, with each day's delay increasing their resentment, their mental depression, and their apprehension lest they may become dependent upon the charity

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First cost should be no consideration when considering the use of tungsten carbide dies. They not only outlast steel dies many times, but they stay sharp longer between grinds—they give a better finish on the surface and edges of the parts produced—accuracy is built in to stay—they are cheaper in the long runs.

Tungsten carbide dies, made by New England, will give maximum satisfaction. You can be sure they will be made exactly as specified, plus that New England extra—mirror finish. Why not send us your drawings (plus complete information) for an estimate—there is no obligation.

NEW ENGLAND CARBIDE TOOL CO.
INCORPORATED

60 Brookline St., Cambridge 39, Massachusetts

- FORMING
- SLITTING
- COMPACTING
- NOTCHING
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- PERFORATING
- BENDING
- SLOTTING
- CUTTING OFF
- SHAVING
- ETC., ETC., ETC.



In War, as in Peace...

CERRO ALLOYS

Save time and cut costs!

CERROMATRIX (Melting Temp. 250° F.) For securing punch and die parts, anchoring machine parts without expensive drive fits, short run forming dies and other metal-working applications.

CERROBEND (Melting Temp. 158° F.) Used as a filler in bending thin-walled tubing to small radii. Easily removed in boiling water. Also used for aircraft assembly jigs, templates for forming dies and other purposes.

CERROSAFE (Melting Temp. 190° F.) Used to accurately proof-cast cavities such as molds, gun chambers, forging dies, etc., and many similar applications.

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Copper Corporation**

40 WALL ST.

NEW YORK 5, N. Y.

of relatives or friends.

Some eighteen months ago the Caterpillar Tractor Company management became aware that from 4,000 to 5,000 employees would return to their jobs after the war and with many of them suffering from physical handicaps; thus it was imperative that a program be devel-



Given the Job of Repairing Safety Glasses for the Plant, this Blind Worker can Tell Colored Lenses from Clear Lenses by the Rapidity with which the Lenses Absorb Heat when Held over a Lamp

oped for taking care of these men. In facing this problem the company had the advantage of many years of experience in the rehabilitation of their own physically handicapped. Steps were immediately taken to set up such a program, with close cooperation between Medical, Personnel, Training and Safety Divisions.

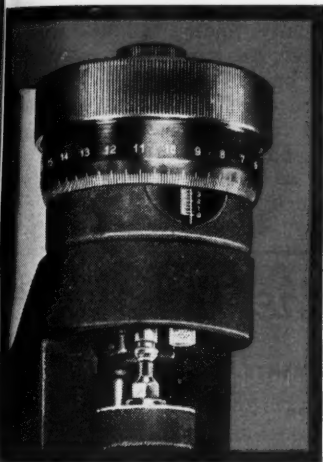
It was first necessary to determine the types of jobs that would be avail-

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It's New - a **COMPARATOR** *with* **MICROMETER HEAD** *and* **DIAL INDICATOR**

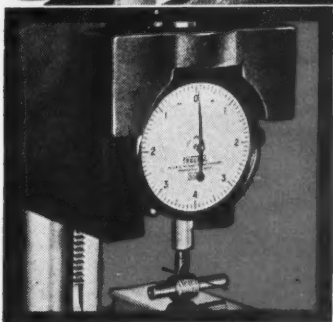
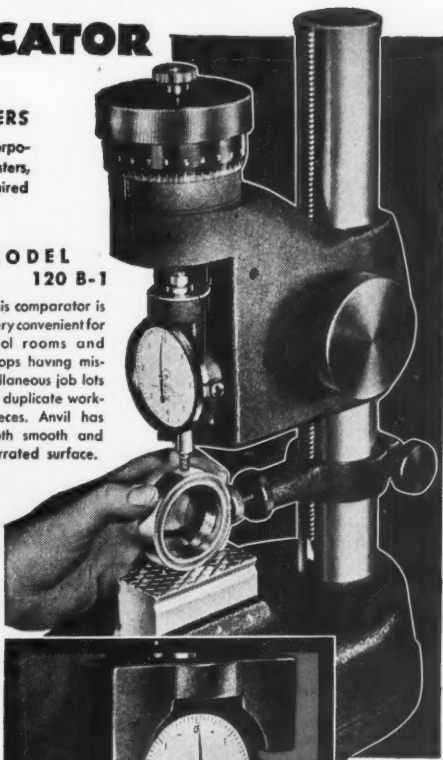
YOU SET IT DIRECTLY WITHOUT MASTERS

The combination Micrometer and Dial Indicator Head incorporates its own Master. A complete set of Gage blocks, or masters, are not necessary. You simply set the micrometer to the required dimension, lock it, and then compare workpieces, etc.



MODEL 120 B-1

This comparator is very convenient for tool rooms and shops having miscellaneous job lots of duplicate workpieces. Anvil has both smooth and serrated surface.



THREE-WIRE THREAD MEASURING

is easy on this new comparator because the Micrometer Head enables you to read the actual dimension of the Pitch Diameter. The Dial Indicator then compares the diameters of other similar screw threads. The weight over the Indicator is for coarse threads.

FEDERAL PRODUCTS CORPORATION • 1144 Eddy St., Providence, R. I.

★ ★ ★ ★ ★ **FEDERAL** ★ ★ ★ ★ ★

PRECISION MEASURING INSTRUMENTS

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MODERN MACHINE SHOP 177

able for handicapped workers, and accordingly a survey was made in which each supervisor listed all the jobs in his department that could be performed by employees with the handicaps indicated on the survey cards.

Working from these analyses, and already equipped with experience in job analysis, the Personnel Division was able to determine the type of jobs available in the plant for physically handicapped workers.

The physically handicapped ex-service man who applies for employment is first interviewed by the Personnel Division, and then—if acceptable upon all other accounts—is presented to the Medical Division for its approval of the specific job chosen for this applicant. Upon receiving such approval, a personal interview follows in which the necessity for care and safety in his work is stressed and

a note is placed upon his record card that no transfer may be made without the consent of the Medical Division.

The handling of handicapped workers is made the subject of a special lecture in the supervisors' conference and all supervisors and department heads are carefully instructed in the proper handling of these employees. Job trainers are given special instructions for training the physically handicapped. The success of the program is evidenced by the fact that the supervisors and job trainers are continually finding additional tasks that can be performed by workers minus one or more body members, and are asking for additional handicapped employees. Several supervisors have learned the sign language so that they might converse with their deaf-mute workers.

Many of the physically handi-

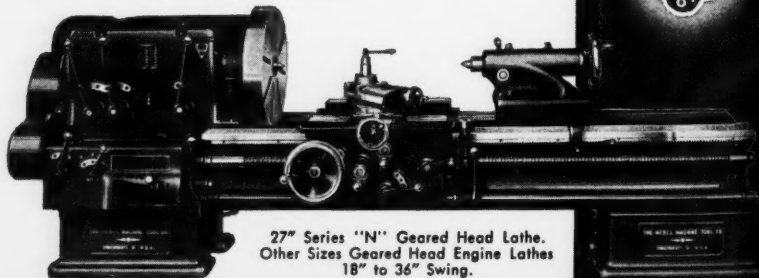
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A MODERN LATHE. ALL THE LATEST IMPROVEMENTS.

Timken Bearings
Self Oiling Headstock
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Quick Change Gear
Double Wall Self Oiling Apron
Quick Action Apron Levers
Thread Chasing Dial

We also manufacture a line of Removable Block and Extension Bed Gap Lathes.
Write for circulars.



The Nebel Machine Tool Co.
CINCINNATI OHIO

record card
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Where you Can't take a Chance



use PARKER-KALON SOCKET SCREWS

WHEN you specify Parker-Kalon Cold-forged Socket Screws, you get unusual protection against "doubtful" screws — screws that *look* all right, but which fail to *work* right.

Accuracy, strength, and uniformity are pre-determined by Parker-Kalon's unequalled Quality-Control routine, in which every mechanical and physical characteristic of the screws is carefully checked. Tests and inspections cover Chem-

ical Analysis: Tensile and Torsional Strength; Ductility: Shock Resistance under Tension and Shear; Hardness: Head and Socket Size and Position; Thread Fit.

Specify PARKER-KALON next time you order Socket Screws . . . and be sure of getting screws that can "take it"! They cost no more. Parker-Kalon Corporation, 190-198 Varick Street, New York 14, N. Y.

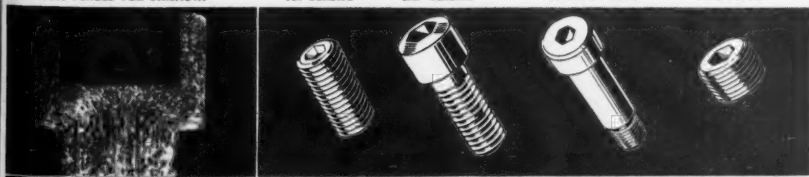
COLD-FORGED FOR STRENGTH

SET SCREWS

CAP SCREWS

STRIPPER BOLTS

PIPE PLUGS



A Product of **PARKER-KALON**—Specialists in Fastening Devices



In Spite of a Crippled Hand, this Employee has Learned to Operate a Typewriter at a Satisfactory Rate of Speed and is thus Enabled to Carry On a Normal Task

capped employees are attending special classes in our training school in order that they may advance in their quest of independence. There can be

shown no special favors, and are in no way considered as accepting charity.

At present "Caterpillar" has approximately eight hundred such han-

no doubt that this program has been successful at "Caterpillar," for the production, safety and absentee records of the vast majority of these people are above normal. In practically every case the jobs selected for them are such that they are enabled to turn out as much production as normal individuals and are paid accordingly; they are

DESMOND GRINDING WHEEL DRESSERS



Desmond Hex Dresser



Desmond Heavy-Duty Dresser



Desmond Huntington Dressers

Our Desmond Huntington Cutters are made in all sizes.



We manufacture only complete line of dressers and cutters on the market, and will be glad to send samples for trial. Write for copy of our new catalog and name of your nearest jobber.



THE DESMOND-STEPHAN MFG. CO.
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FORMERLY
Straight type grinder
was slow on maneu-
vering into corners.



**CONE WHEEL CLEANS UP
CASTINGS 25% FASTER**

STRAIGHT type 6000 R.P.M. Air grinders with 6-inch wheels were the rule in this foundry. Then came a lot of small castings with hard-to-get-at spots to be cleaned. Production wasn't anything to write home about. So they called in the Rotor Application Engineer for a bull's-eye analysis.

"It's an Air tool job," said the R. A. E., "but you need a cone wheel to get at those corners quicker . . . and you need 8500 R.P.M. tools to take full advantage of cone wheel cutting action." The change was made to 8500 R.P.M.

Rotor Air cone type grinders with these results:

1. 25% more output per tool.
2. Less operator fatigue.
3. 25% longer wheel life.

Our diary is full of similar cases where we've steered shops to the *right tool*—either Air or High-Cycle—and given the boys at the wheel something to write home about in the way of increased war production. We'd be glad to analyze your problems.

Yours for the *right tool*,
AIR O'TOOL



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ROTOR TOOL

CO.

CLEVELAND OHIO

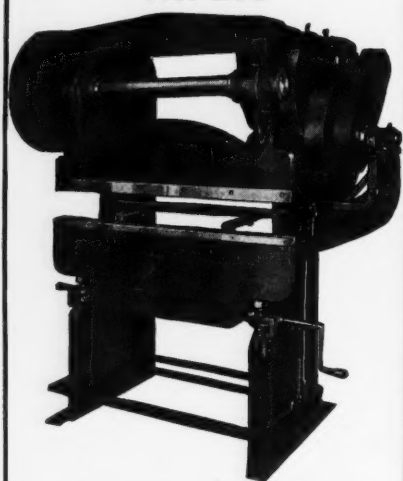


HIGH
CYCLE

UNBIASED ANALYSIS OF PORTABLE TOOL PROBLEMS

CHICAGO STEEL PRESS

No. 253



SPEED WAR PRODUCTION OF SHEET METAL WORK

USE FOR...

1. FORMING
2. EMBOSsing
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4. NOTCHING
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of Ammunition Cases, Bomb Box Liners,
Bomb Fins, Aircraft Parts and Many
Other Offense Products.

The No. 253 CHICAGO STEEL PRESS
is accurate, compact, and ruggedly
constructed of highest quality materials.
Sizes 4, 5 and 6 ft. capacities up to 10
gauge.

Write for Circular No. 255

**DREIS & KRUMP MFG.
Company**

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CHICAGO 36

ILLINOIS

dicapped employees—a remarkable number when consideration is given to the fact that the product is heavy machinery, calling for light and heavy machine work, similar types of assembling and gray iron and aluminum foundry work.

Those suffering from nervous disorders upon their return from military service will present a problem of some magnitude, but certainly many of these individuals will recover if we are able to quickly absorb them into occupations such that they will soon become convinced that they are fully capable of taking care of themselves and their dependents. There is a wide contrast between such a program and the days of calling upon one employer after another, weeks of disappointments and indecisions which only further aggravate the individual's condition, forcing him to accept any aid available for his livelihood. Many cases of this type would otherwise require special medical care and vocational training.

A handicapped returning service man who has been put to work upon a task that he can perform as well as his more fortunate brothers usually becomes a good worker—conscientious, capable, and grateful for the opportunity to carry his share of the load. Considering that he acquired his handicap in an effort to make the world safe for others, it is surely a double privilege to make the world more secure for such a person. Fitted to the proper task, he fits into his place as a responsible and worthwhile member of his community, and the community benefits from his presence.

A careful examination of the individual tasks in factory work will disclose many that are suitable for handicapped workers. For example, among the workers at "Caterpillar"

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July, 1944

METALITE CLOTH SLOTTED DISCS

$\frac{3}{8}$ to 6 inch diameters

Speed War Jobs



AT LEFT: This stainless steel Fuel Line was previously hand-scraped and hand-sanded. Now, one spindle equipped with $\frac{3}{4}$ " slotted Disc, grit #100, does the inside edge. And, equipped with a cup adaptor, also does the outside edge using $1\frac{1}{8}$ " Slotted Disc, grit #120. Production is up 350%.

AT RIGHT: This 2-Bore Aluminum Throttle body has a finished bore. There was slippage with hand scrapers. Two $1\frac{1}{2}$ " unslotted Metalite discs, grit #60, back to back, were used. This method proved twice as fast as the former hand scraping.

BELOW: In this illustration 5" Slotted Discs, grit #100, are used to put $\frac{1}{16}$ " radius on the edges of these Magnesium 3-Bore Throttle Bodies. This saved tooling and additional machines. Time, 3 bores, .68 of a minute.



These SLOTTED DISCS, in almost endless sizes and grits, are but one of many Metalite Cloth "Gadgets" ready for instant use on power tools. We'll gladly help you select the proper "Gadgets" for improving a wide variety of your own sanding and finishing operations. Write us.

BEHR-MANNING · TROY, N. Y.

(DIVISION OF NORTON COMPANY)



A Worker With One Hand Tests Engines as Efficiently as One with Two Hands

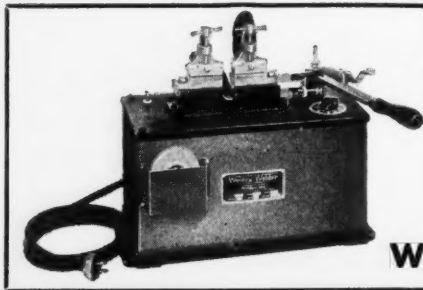
other industrial workers. He overhauls and adjusts safety glasses which have been returned for repairs. A person with such a handicap as his often develops extreme skill and manual dexterity, and such is the case here.

When he finds, by feeling with his fingers, that a lens has become

is a man who had been blind since birth. He sold newspapers for many years but after the United States entered the war he felt that he should be able to perform some task that would contribute to the war effort and accordingly applied for employment at the office of our company.

The job given him was one in which he protects the eyesight of

pitted from welding or grinding wheel sparks, he replaces the old lens with a new one—and in doing so is able to tell whether the glass is clear or colored. It is necessary to make this distinction because safety glasses with both colored and clear lenses are used in this plant. The trick is a simple one when the fingertips have been trained to "see."



BAND SAW WELDERS

No. 141 may be had without grinder or with grinder for removing flash. Has 6 point heat control, one for annealing weld.

Welds saws $\frac{3}{4}$ " wide and smaller.

110 volt 60 cycle single phase. Can be made in 220 volt.

Send for catalog.

WELDEX INC.

7327 McDonald Ave.
DETROIT

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Two Hands

REXALLOY

STANDARD TOOL BITS • STANDARD TIPPED TOOLS • SPECIAL TOOLS-TIPPED AND SOLID • CASTINGS

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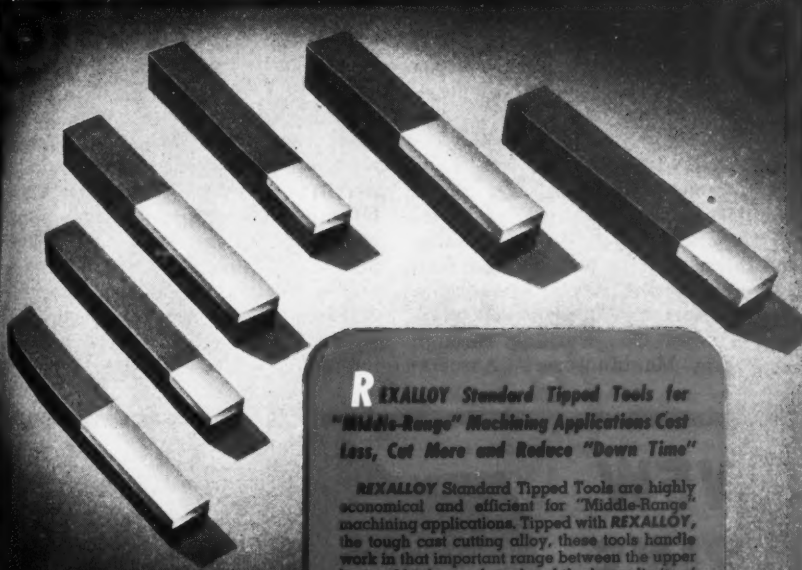
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Ave.

July, 1944



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- ☐ Please mail me your new 28-page book, "REXALLOY CUTTING TOOLS".
 - ☐ We would like to discuss the possible use of REXALLOY in our plant.

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MM 7

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He holds the lens over a lamp bulb and is able to tell by the manner in which it heats whether it is clear or colored; the colored lens transmits less heat than a clear lens, and thus retains more heat.

This man is proud that he is able to serve in a war plant and that he has released an able-bodied man for more skilled work or to the armed forces. Giving jobs to the physically handicapped is more than a humanitarian gesture—it is sound business.

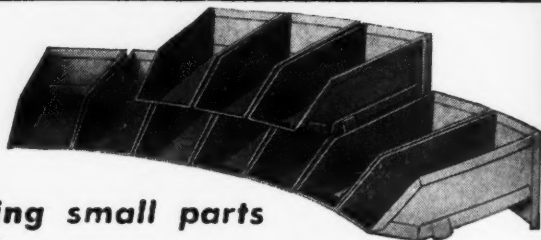
The "Peoria Plan"

Anticipating the return of the handicapped veteran to a life which should be as nearly normal as possible, it became obvious that there was need for a plan to be organized and developed by the whole community. Under the original impetus of Caterpillar Tractor Co., working through the Peoria Manufacturers' Associa-

tion, the Greater Peoria Area was organized and is being made ready to accept the physically handicapped who return from military service. The undeniable success of this program has brought ministers, educators, businessmen, labor and social workers in a steady stream to establish the larger community program. The community efforts have been joined in what is termed "The Peoria Plan for Human Rehabilitation."

"The Peoria Plan" organization chart reproduced here is the framework of the community structure on which the burden of human rehabilitation rests. These general principles are time-tested and work-proved. We believe that in them lie the essentials of a comprehensive, efficient, and workable program which, multiplied many times by the number of cities, towns, and villages

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Floors slope to feed parts to front—end reaching and fumbling.

Bins taper toward front to form convenient semi-circle—keep all bins within easy reach.

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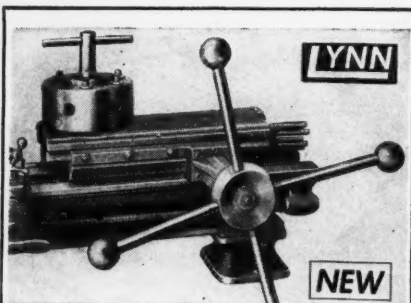
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Extra heavy turret head, 6" diameter. Long turret travel, 5 1/2 inches. Tool holes designed to bore out to 1". Ground and hardened indexing parts; hand scraped bearing surfaces. For complete information write for bulletin 1215.

Complete line of bed turrets and self-indexing tool post turrets for large lathes.

*Distributed nationally through jobbers
Immediate delivery from stock or factory on
standard makes*

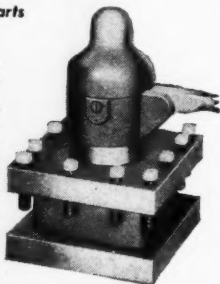
LYNN SELF INDEXING TOOL POST TURRETS

*All Working Parts
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For lathes from 12" to 28" swing. Holds 4 tools. Self-indexing to 8 positions. Hardened indexing pin and inserts. No cams to wear. Solid steel blocks—sizes 5 1/4", 6 1/2" and 8".

Prompt shipment

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over the nation, will conserve the greatest of all American assets—useful and self-respecting human beings.

At the top of the chart is the executive branch, which is directed by a business executive and myself. The committee consists of a cohesive smaller group empowered to pass on policy. Branching to the right from



The Loss of a Leg doesn't prevent this Worker from Doing a Normal Day's Work at this Task

this are the major committees, which are considered individually in this explanation.

The purpose of the organization committee is to enlist all phases of community activity—business, labor, church, school, veterans' groups, etc.—that are interested in the human rehabilitation problem. This group is mainly consultive for the purpose of promoting civic enthusiasm and dispatch. The publicity activities include winning public support through the means of the radio, movies, newspapers, plant publications, labor mag-

serve the
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human be-

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Knock-Out ARC WELDERS The World Over

Engineered correctly by men with years of experience. Silent operation, ease in striking arc, wide range of application, low initial cost, economy of operation, negligible upkeep, burn-out proof transformers, all go to distinguish K-O Welders. These time-tested units are made to serve their employer well and show him a substantial profit whether on maintenance or production.



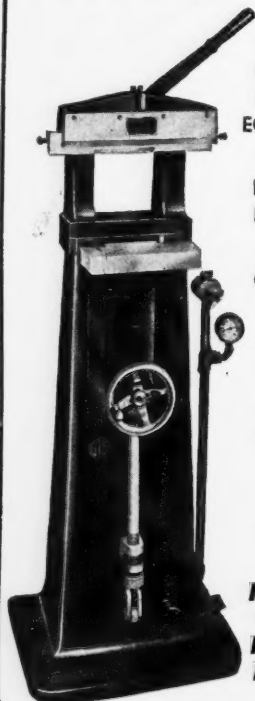
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MARKING
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HI-DUTY
MARKING
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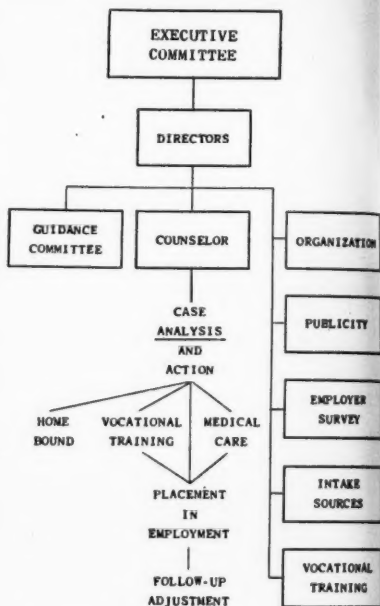
This machine operates from your plant air line, and is one of numerous models built to produce fast, neat marking on metal parts. Hi-Duty marking machines may be had for practically any marking operation, and we will be glad to make recommendations upon receipt of your inquiries. Send prints or samples of parts to be marked, showing lettering and location, also state required production.

GEO. T. SCHMIDT, Inc.
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CHICAGO 13, ILLINOIS

azines, and speakers.

The employer survey committee undertakes in advance by means of a survey card to canvass all job possibilities in the community that handicapped men and women can do.

Vocational training aids come next.

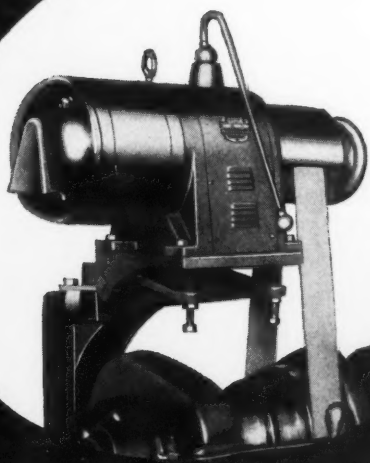


Organization Chart of "The Peoria Plan"

In Peoria, Bradley Polytechnic Institute, Brown's School of Business, and others, contracted by the government, are already doing rehabilitation work with ex-service men. They offer both facilities and counsel.

A complete case analysis is effected, of course, by the counselor before any placement is attempted. Case action is the working out of the disposition, with complete records being kept for follow-up. Fully employables will find the transition relative-

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MODERN MACHINE SHOP 191

ly easy. Medical restoration is effected through existing agencies for those needing it, as is vocational training in the manner mentioned.

The guidance committee is a small group that acts as a clearing house for the final disposition of the case.

In conclusion, here is a brief summary of "The Peoria Plan."

1. Now is the time to organize—do not wait until the disabled veterans return from the war.
2. A well-organized program in each company is necessary for success. In some organizations, this consists of close co-operation between Medical, Personnel, Training, and Safety Divisions, as well as factory supervisors.
3. A survey of jobs is essential.
4. Employers of small groups can participate because of first-hand knowledge of their jobs.
5. The production and safety rec-

ords of the physically handicapped are above average.

6. Classification of handicapped individuals should be clarified.
7. "War neurosis" cases will benefit from quick employment with special attention given to individual cases.
8. Time is valuable. Soon after the handicapped returning veteran begins to look for a job, he should be properly placed. Delay is discouraging and demoralizing.

"The Peoria Plan for Human Rehabilitation" gives to every individual the opportunity to exercise his "God-given-right" to care for himself and his dependents. Above all, it demonstrates the willingness of all concerned to contribute their share in making the United States of America the outstanding example of true democracy.



The UNUSUAL LUERS Patented Threading Tool enables you, MR. MECHANIC, to chase threads—BETTER THREADS—from 25% to 50% FASTER.

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With Less "Elbow-Grease"
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have teeth like
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Chips roll easily off the teeth of Simonds Files . . . long, spiral chips that mean smooth, easy cutting instead of scraping that leads to quick fatigue. Simonds *Red Tang* File teeth are designed and shaped like the teeth of Simonds Metal-Cutting Saws, to cut more metal with each stroke . . . and to stay sharp longer. Order them from your Industrial Supply Distributor.

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SHORTEN THE WAR . . . BUY BONDS

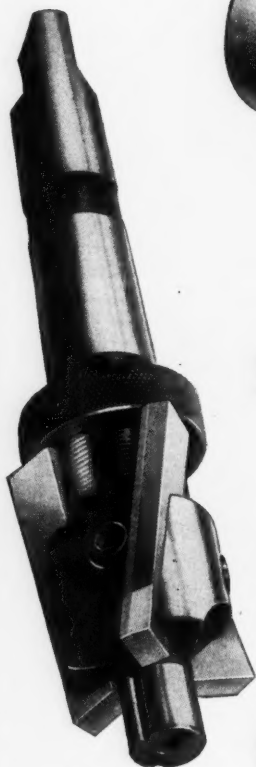


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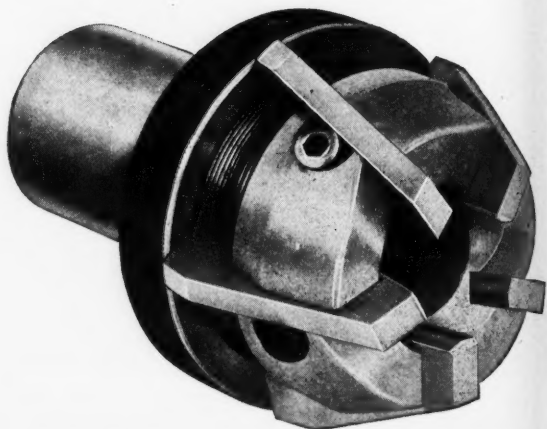
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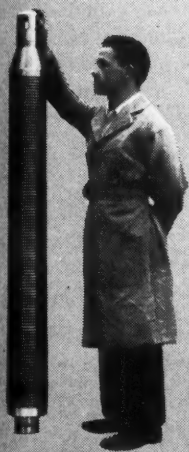
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Making broaches comes pretty close
to being a

Fine Art

What is thought to
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high speed steel
gear tooth broach
(893 lb.) ever
produced.



IT CUTS **55**
INTERNAL GEAR TEETH
IN A COUPLING SLEEVE
48 TIMES FASTER WITH
INCREASED ACCURACY
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THAN THESE TEETH
WERE CUT BY THE
PREVIOUS OPERATION

There is no branch of tool making that requires as much actual first-hand experience as the design and manufacture of accurate and dependable broaches. Seemingly, negligible factors often result in large differences in the effectiveness and the life of the broach. Very seldom are any two broach problems just alike and only the broach organization with wide experience is capable of evaluating all the factors which enter individual broaching problems.

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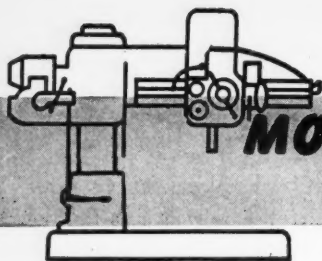
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SPECIALISTS ON SPUR AND HELICAL
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ORIGINATORS OF ROTARY SHAVING
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July, 1944

MODERN MACHINE SHOP. 197



MODERN EQUIPMENT AT WORK

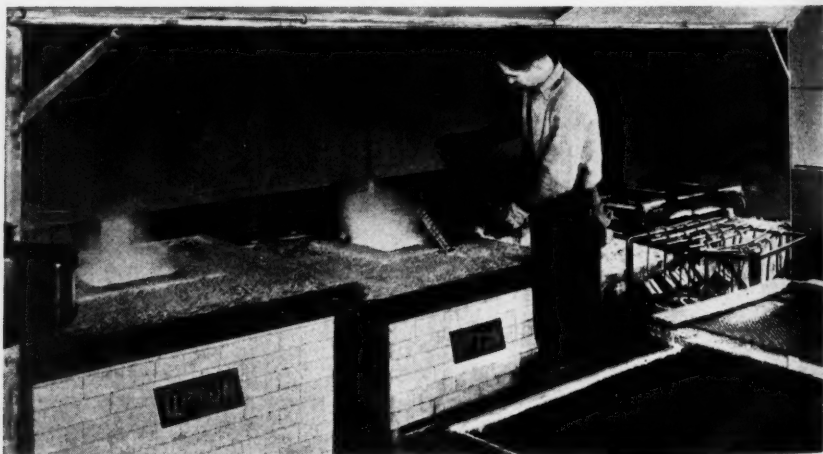
Selective Copper Brazing In Salt Bath Furnaces

SELECTIVE copper brazing of an ordnance part on a high production basis yet without the high scrap percentage of conventional brazing methods has been developed at the Industrial Steel Treating Company of Jackson, Michigan, and is in production there at the present time.

The process employs electric salt bath furnaces which not only permit the selective heating of the parts to

be brazed but also eliminates decarburization, and has reduced scrap from 15 per cent to a maximum of 3 per cent as compared with conventional methods. The salt bath furnace method has also reduced distortion so that the amount of time and cost involved in straightening brazed work has become negligible. As a result, what was once considered a difficult, "tricky" job has now become a simple, foolproof production heat treating operation with results that are completely predictable.

Selective copper brazing—the tips only—of ordnance assembly in Upton Electric Salt Bath Furnaces is accomplished with big reduction in scrap, improvement in finished work and at high speeds, brazing time being less than one minute and without special costly handling equipment.



WITH THIS 3-PLY BACKING WELDISKS *just can't break...*

...that's why WELDISKS
speed-up grinding *safely!*



Examine this 3-ply backing carefully, and you'll see why workers aren't afraid to speed up grinding when using WELDISKS – the disks that just can't break.

Notice the grit! Made of electric furnace treated aluminum oxide, it's the toughest abrasive in commercial use. Nothing like it for high-speed grinding!

Notice the fibre – specially treated and pressed for double strength and hardness! It's this that keeps WELDISK edges from going "flabby" under fast, heavy grinding pressures.

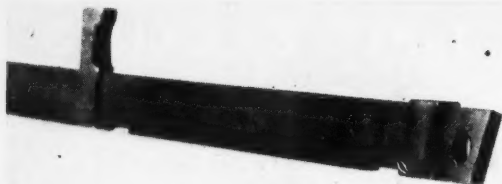
Finally, notice the layers of heavy cloth front and back of fibre. They're what keeps the fibre from cracking when bent.

Then...to round out your examination...write for free trial samples. All grits 320 to 16. Abrasive Products, Inc., 507 Pearl St., South Braintree, Mass.



Abrasive Products, Inc.

SOUTH BRAINTREE, MASSACHUSETTS • MAKERS OF JEWEL COATED ABRASIVES



Two cheek plates are tack welded and brazed to the strip with notable fine surface finish following quench. Process features absence of blown copper, surface blobs, reduction of distortion and simplicity of operation.



The operation consists of copper brazing two small cheek plates to a length of 1050 steel. The plates, of approximately one inch square area and but 1/8th-inch thickness, are first tack welded (by spot welder) to the sides of the strip, the copper shim being inserted prior to the welding. The parts are then placed in a rack which holds 20 pieces.

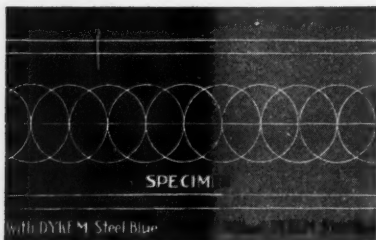
Three standard electrically heated salt bath furnaces are employed; pre-heat, high heat and quench. The temperatures of the furnaces are controlled automatically to close limits with special timing controls. The

control for the high heat furnace holds the temperature of the furnace at a constant level until work is to be treated. Then, a special heat measuring control on the instrument panel permits the operator to add exactly the required

amount of heat for the exact pre-determined time. Thus the operation is entirely automatic with temperatures and time fully controlled.

The rack, with the work, is first placed over the mouth of the pre-heat furnace so that the ends of the work, which are to be brazed, are immersed in the molten salt. The temperature of this furnace is held at 1550 deg. F. When the work has been sufficiently preheated, rack is transferred to the high heat furnace immediately adjacent.

The time that the work remains in the high heat furnace and the tem-



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Simply brush on, right at the bench; ready for the layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy.

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MO.

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perature at which the furnace is held are both important. Immediately before the operator transfers the parts to the high heat furnace, he sets the control to add sufficient power to hold the temperature of the salt at exactly 2090 deg. F. for exactly 3/4 minute. When he places the work in the high heat furnace, he touches a button on the control board which starts this cycle.

At the end of the time, the operator is signaled and the work is transferred to the quench.

The salt quench is one of the reasons for the outstanding success of the entire process. This salt quench checks the flow of copper immediately. It eliminates the tendency of the copper to run or blow or form a blob on the surface of the work. The work comes out of the salt quench clean and smooth excepting for a

thin and unimportant coating of salt. Temperature of the quench, usually held at 1150 deg. F. is not critical, nor is it too important; it is only necessary that the quench be salt, since a water or oil quench will invariably blow the copper out and form blobs on the surface.

After the quench the work is re-hardened and straightened. Re-hardening is also a simple matter since the use of the salt bath prevents any decarburization sufficient to necessitate a re-carburizing before re-hardening. Work is reheated to 1550 deg. F. immediately after the quenching so that it is hardened to the required 50 to 52 Rockwell.

An interesting feature of the process is that flux is not required, the salt itself acts as a flux.

The amount of straightening that is required is nominal due to the fact

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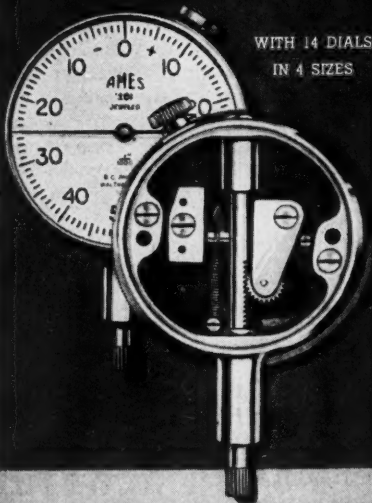
Five assembly plants (note left) provide quick servicing facilities for Producto Die Sets and Die Makers' Accessories. In addition stocks of Die Makers' accessories are carried in New York, Buffalo, Syracuse, Philadelphia, Dayton and San Francisco Sales Offices. Special Die Sets and Bolster Plates are made in and shipped from Bridgeport and Detroit.

Secure sizes and specifications from our No. 9 Die Set Catalog. Also manufacturers of Producto Modern Machine Vises and Shop Tools. Distributors of Dickerman Automatic Press Feeds.

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These Dial Indicators have all the desirable features for measuring and checking accuracy. Four sizes to American Gage Design Committee specifications. Fourteen different dial numberings. One-piece, drop-forged cases and stems. Wire attached bezels. Cup-shaped dials that need no springs beneath. Pinions and shafts of hardened steel, ground for accurate fitting and long wear. Various styles of backs and contact points. The best and most effective shock-absorbing wheel assembly, optional.

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that only a small portion of the part is heated. Moreover, the temperature of the bath is controlled to such close limits that even though the entire part were immersed at the time of brazing, distortion would still be far less than with conventional methods.

The same equipment was also used for a time to braze the same parts but with brass instead of copper as the bonding medium. The time required was slightly less than that required for the copper brazing operation, but otherwise results were equally dependable.

Production speeds of brazing by this process, which employs Upton Electric Salt Bath Furnaces with the Upton Heat Measuring control, yet without elaborate work handling conveying equipment, is estimated at 600 to 700 per hour.

At the present time, the high speed of brazing allows the work to be completed in considerably less than a full working day. The balance of the time is devoted to straight commercial high speed and moly tool steel hardening. This work is being done interchangeably in the identical furnaces with the copper brazing.

Operations Eliminated; Production Increased by Cutter-Change

THE elimination of one milling machine and two grinders from an operation on urgently needed naval ordnance parts, as well as the speeding up of production, was recently accomplished at a United States Naval Ordnance plant by simply changing to Carboloy cemented carbide tipped cutters in the "rough" milling operation. Not only was a sufficiently

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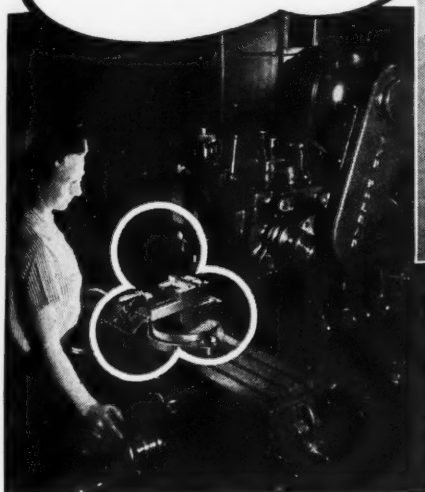
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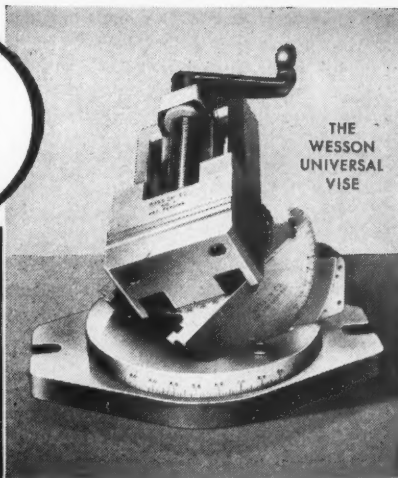
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an **EXPERT**



Difficult angle set-ups can be made quickly . . . in a fraction of the time ordinarily required. Compact size, lowest overall height, ability to work in close quarters, and wide range of capacity permit many adaptations to standard machines . . . you multiply the uses of machine tools with WESSON Vises. Two sizes. See nearest distributor, or write for bulletin. WESSON PRODUCTS CO., 710 Fisher Bldg., Detroit 2, Mich.



Don't let those "manpower blues" get you down when you have precision angle milling to do! Remember . . . WESSON Vises are immediately available. You can get *them* on the job, fast! And any operator can do *expert* precision angle milling, drilling, grinding, reaming, slotting, or what have you . . . with WESSON Universal Vises. Rugged and rigid, free from "chatter," these vises permit high speed precision-production or tool room service, and save time and money.



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Please send me illustrated bulletin of WESSON Universal VISES and ANGLE PLATES.

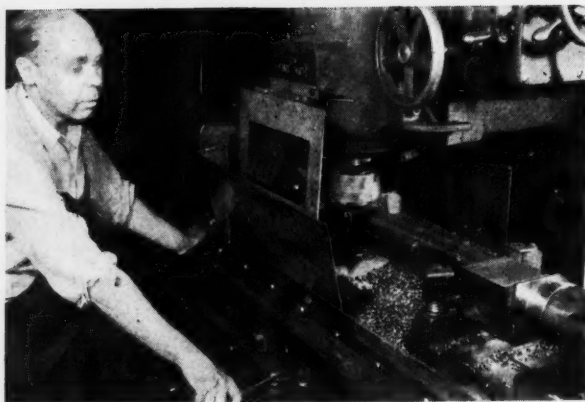
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Firm Name

Address..... City & State.....

July, 1944

MODERN MACHINE SHOP 207



Milling Breech Casing in Cincinnati Mill, using Carboly Cutters

fine finish obtained in this one milling operation, but cutting time was actually reduced on the machine.

The operation involved the milling of two sides of a breech casing made from S. A. E. 4320 steel.

In re-tooling the machines, 5" di-

travel. The cut taken is 9" long and 0.125" deep. Machining time with this setup was 2 minutes for each side. Average life per grind with the carbide cutters also rose to 40 pieces, as against 25 pieces for the "roughing" cutters formerly used.

ameter milling cutters having 10 blades each tipped with Carboly steel cutting grade 78 cemented carbide, were used. Optimum machining conditions were obtained at 650 S. F. M. with a $7\frac{1}{2}$ " per minute table

High Quality

Quick Delivery

SMALL PINS

**VOLUME PRODUCTION BY OUR
SPECIAL NEW TYPE EQUIPMENT**

.030" to .125" Diam.

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**SMOOTH ENDS — CLOSE LENGTH TOLERANCES — CONCENTRIC
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The Greatest American Legend...

He's a man without a last name... a fellow known to every American kid as "Uncle." He is everywhere in his great land—yet no one has ever seen him. He is the great spirit of America... calm, quiet, peaceful and kindly until he gets his "dander" up—then he is determined, strong and his wrath is relentless.

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with every American to defend America.

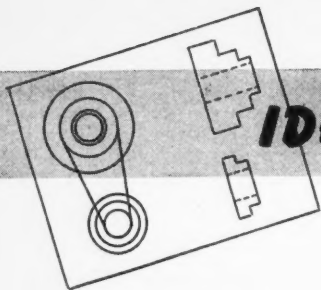
Today, he stands with you... urging you to do more and more in the cause of Victory. To buy more War Bonds—to contribute to the blood bank—to stamp out Black Markets—to defeat inflation—to be untiring in your efforts to hasten the day when our enemies will fall before our might. Ask yourself squarely if you couldn't be doing *more* to aid this great spirit—then *do* it.

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MODERN MACHINE SHOP 211

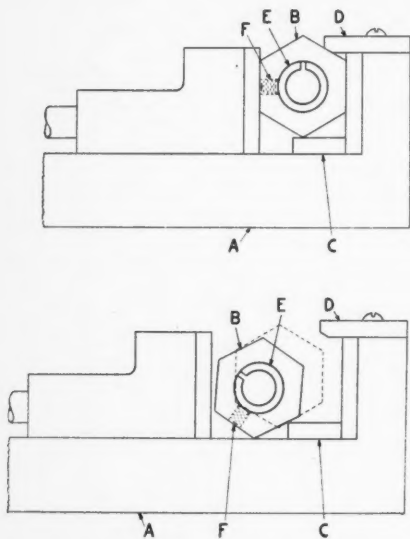


IDEAS FROM READERS

Quick Indexing

By L. KASPER

THE drawings herewith illustrate a method that was devised to reduce costs and increase production in the milling of a quantity of hexagon bolt heads. The advantages of this



Drawings Illustrating Quick Indexing Method for Milling Bolt Heads. (Above) Fig. 1 Shows Position of Workpiece During Milling Operation. (Below) Fig. 2 Shows Movement of Workpiece when Movable Jaw of Vise is in Open Position

method over the use of a dividing head consisted in that the method was not only faster, but also eliminated the possibility of spoilage due to incorrect indexing.

The drawing Fig. 1 shows the position of one of the workpieces in a vise as set for the milling operation. The hexagon-shaped block **B** carries the work (not shown), which is locked in position by means of the setscrew **F** and the split sleeve **E**. Block **B** is supported on one apex by the plate **C**, which is fastened to the body of the air vise **A**. Plate **D** is attached to the top of the fixed jaw of vise **A**, acting as a retainer for the block **B**.

After one milling cut has been taken on the bolt head, the movable jaw of the vise is moved to the open position as shown in Fig. 2. The block **B**, being supported on only one apex, topples over into the space created by the opening of the jaws, assuming the position shown in Fig. 2.

When the movable jaw of the vise is returned to the closed position, block **B** is caused to slide upward onto plate **C**, as shown by the broken line. As the vise jaw is moved quite rapidly, the plate **D** is necessary to prevent block **B** being thrown from plate **C**. It is obvious that each time the vise jaws are opened the block **B** will automatically roll over to the next index position.

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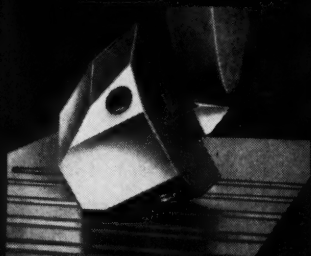
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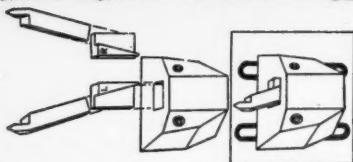
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A Good Turret Lathe Fixture

By ALEX S. ARNOTT

TO machine the tee shown in the upper part of Fig. 1 from the extruded stock shown in the lower part of the same illustration the fixture shown in Fig. 2 was designed. The fixture was especially intended to

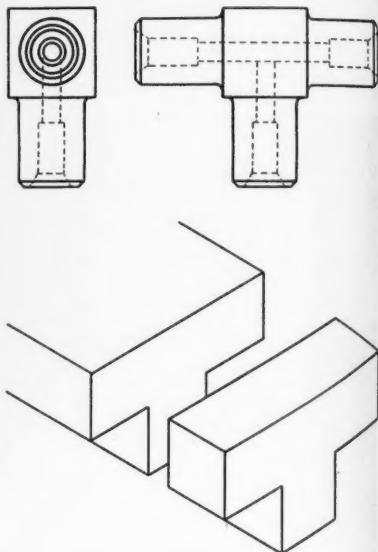


Fig. 1—Above is Shown the Design of a Tee made from the Extruded Stock Shown in the Lower Part of the Illustration

hold the tee concentric with the center line of the lathe spindle during the operations of drilling, boring, chamfering and threading. It has proved to be an excellent tool for the job.

The fixture-body A, Fig. 2, was made in one piece with clearance provided as shown at B to accommodate one arm of the tee while the opposite arm was being machined. The locating point C, against which the workpiece rests, is a hardened

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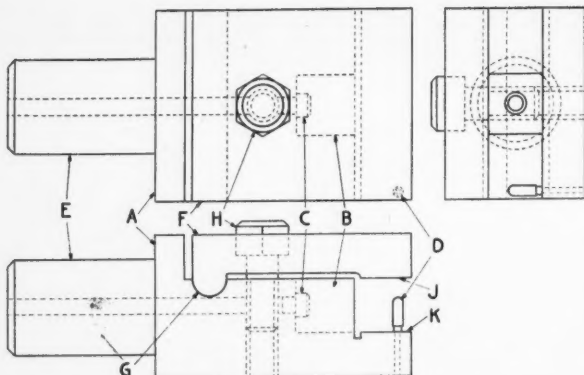


Fig. 2—Design of Fixture Used to Hold Tee for Machining in a Turret Lathe

pin, pressed-fitted into position. The locating pin **D** helps to hold the workpiece in the correct position for accurate machining.

The fixture is held in a standard three-jaw chuck by means of the shank **E**. The clamp **F** is rounded at **G** to provide a good bearing surface,

and is locked onto the work by the standard cap screw **H**. The clamp is hardened, and has a ground surface at **J** to assure good contact under clamping pressure. Thus the workpiece is held for machining between the surfaces **J** and **K**.

The design may be adapted for holding other odd-shaped forms.

Adapting an Open-End Wrench for Round Work

By A. H. WAYCHOFF

WITHOUT damaging it, an open-end wrench can easily be adapted for use on round workpieces as well as for the square or hexagon work for which it was originally intended.

In each side of the jaw a notch is filed, extending about one-third the length of the jaw as shown at **A** and **B** in the illustration. In one side of

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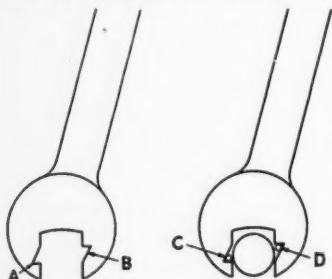
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the jaw the deep part of the notch is toward the open end of the wrench, as shown at A, and in the other side



Drawing Illustrating Method of Adapting Open-End Wrench for Use on Round Work

the deep part of the notch is toward the inner part of the wrench as shown at B. The notches taper to a point at the deep part about one-eighth inch deep.

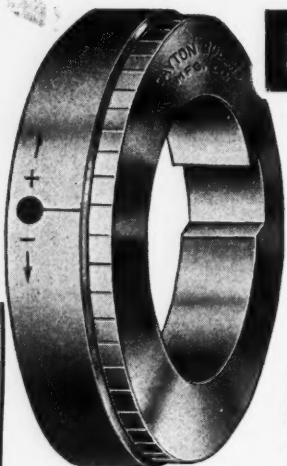
With the notches cut, all that is necessary to use the wrench on round

work is to cut two small pins from nails, round wire or steel rod about one-eighth inch in diameter. With the round work between the jaws, the pins are slipped into place as shown at C and D. As the wrench is pulled around the work, the pins tend to roll until they are firmly wedged between the tapered faces of the slots and the surface of the workpiece. When wedged firmly enough, the pins will prevent the workpiece from slipping and thus it is forced to turn with the wrench.

Welded Swivel Tray Bracket of Simplified Design

(Data and Illustration Courtesy The Lincoln Electric Co., Cleveland, Ohio)

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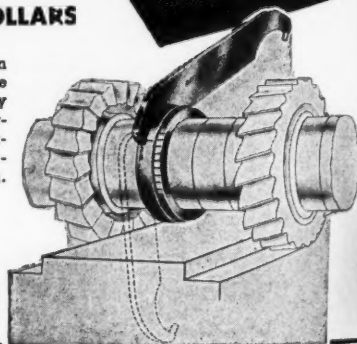
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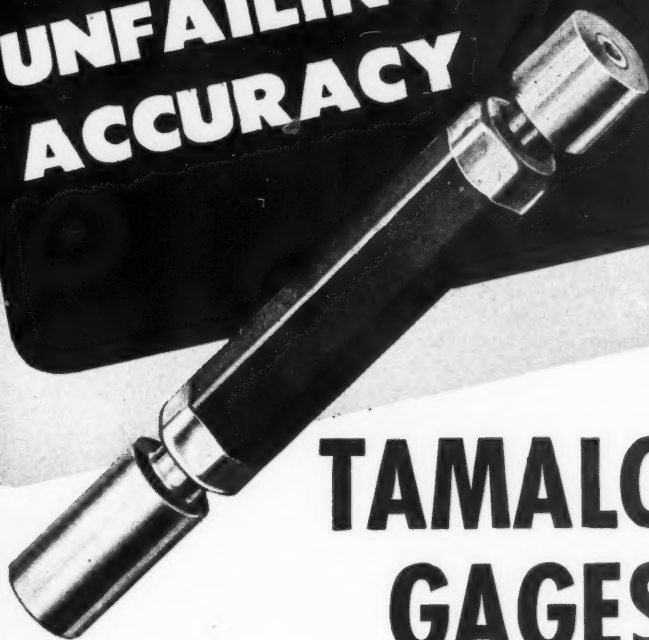
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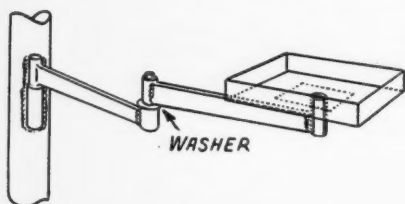
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July, 1944

MODERN MACHINE SHOP 219

in manufacturing operations, one of the simplest and most prominent is that wherein the electric arc is uti-



Tray for Tools or Parts has Novel Swivel Arrangement in Welded Design

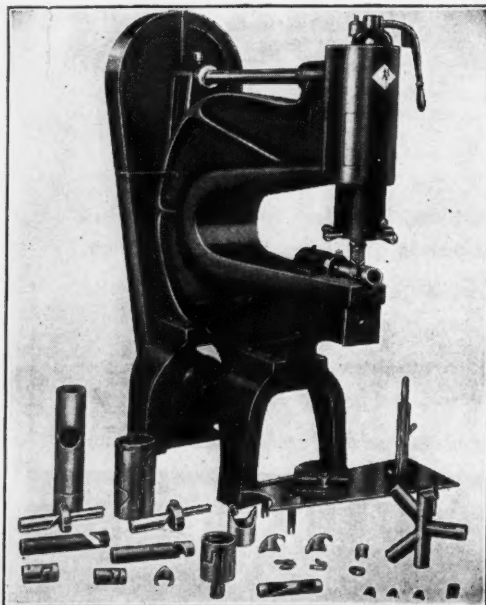
lized for the fabrication of tool and parts trays. Due to the versatility of the welding process, such items as the one shown in the accompanying sketch can be built exactly to requirements. In this bracket and tray arrangement, for example, limited floor area required that the structure take up a minimum of space and yet

be within arm's reach of the worker at all times.

With this objective as the guiding factor, a simplified bracket was made up of a few short lengths of pipe and two pieces of flat bar stock, swiveled at the joints so that the tray can be adjusted to various horizontal positions.

The main anchoring swivel (at left in drawing) consists of a 3-inch length of 1½-inch pipe fillet-welded at each side to a factory upright beam. The connecting member is made up of a 14-inch length of flat stock to which a 4½-inch length of round stock, slightly smaller in diameter than the pipe, has been welded at the top and to the end of the flat member.

This same general construction principle is used for the center and tray swivel joints of the bracket. At the center swivel, a third piece of round bar stock is introduced through



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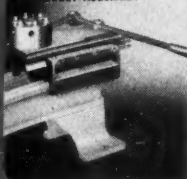
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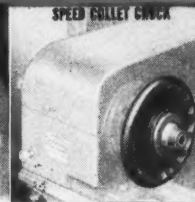
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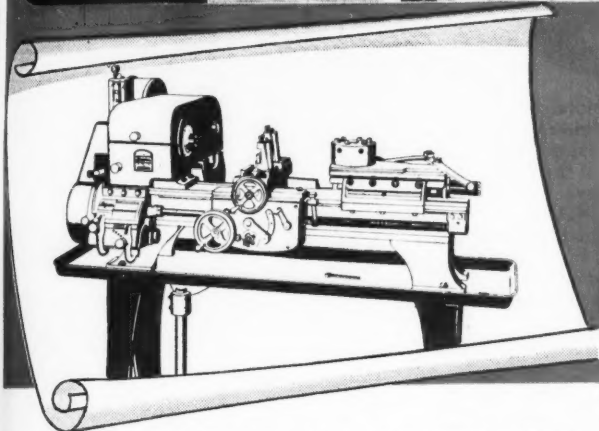
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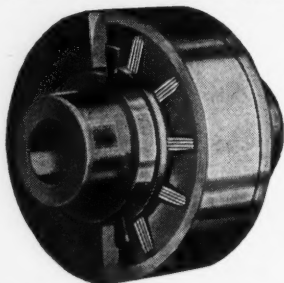
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MODERN MACHINE SHOP

221

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the pipe sections to add rigidity. A washer is placed between the upper and lower sections of pipe to permit free turning of the joint.

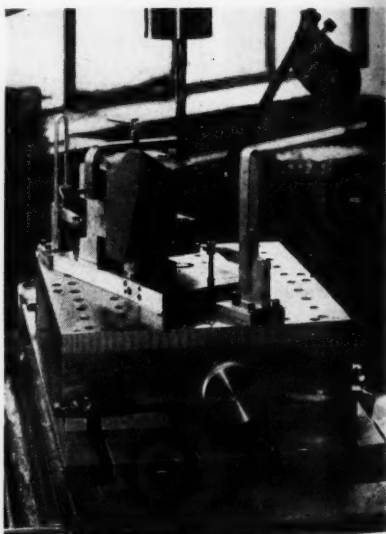
The tray, which in this case is about one foot square, is made of thin-gauge sheet, formed to provide sides, and welded at the seams. A 4-inch piece of plate is skip welded to the bottom center of the tray to which is welded a length of 1½-inch pipe which fits over the projecting end of the smaller pipe section on the bracket permitting the tray itself to be rotated.

During periods when the unit is not needed it folds conveniently back against the beam, out of the way.

Fixture Locating Device for Jig Borer

A JIG borer plate the design of which includes a retractable centering pin for locating a master plate

End View of Jig Borer Plate, Showing Master Plate Located by Centering Pin with Work Clamped to Master Plate



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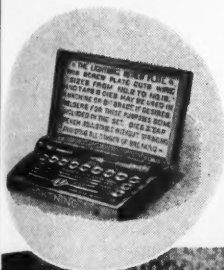
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FROM OUR CATALOG OF 1875

This quaint wood cut was reproduced from the pages of the 1875 catalog of the Wiley & Russell Manufacturing Company, one of the parent companies of the Greenfield Tap & Die Corporation. It shows the "finest threading tools" of that time and the copy modestly states "it is warranted to do five times the work that can be done in the old way."



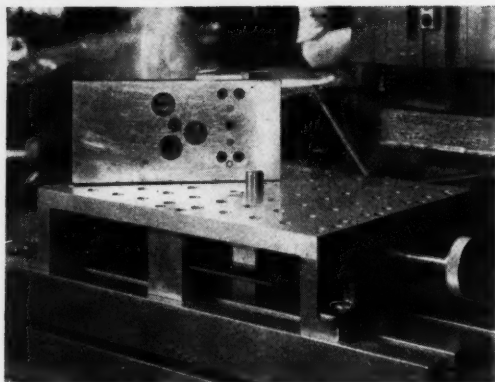
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Side View of Jig Borer Plate
Showing Construction

to which the work has been clamped has been devised at General Electric's Schenectady Works, for use where a large variety of small parts must be bored on a short-run basis.

The arrangement allows the operator to change quickly from one job to another without relocating the

center and, in addition, he can change from a fixture operation to a clampdown operation without removing the jig borer plate. This is made possible by the use of a bolt hole tapped in the plate on two-inch centers.

The jig borer plate is made from one-inch flat stock, 15 inches wide and 20 inches long. An L-shaped leg at each

end of the plate raises its top surface four inches above the table and provides a shoulder for clamping the device to the machine table.

The retractable pin, centered directly under the machine-spindle, is raised and lowered by means of a horizontal shaft to which it is geared,

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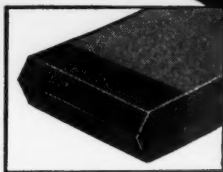
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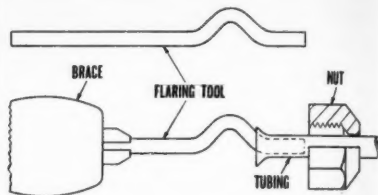
the outer end of the shaft carrying a knurled handle by which it is revolved to feed the pin up or down.

In assembling the jig borer plate, the legs are welded to the plate after which it is stress annealed. The holes are bored in the plate after it has been machined true with the table.

A Simple Flaring Tool

By RONALD EYRICH

A FLARING tool of simple but effective design, for use on copper tubing, can be made by simply bending a short length of mild steel



Drawing of Flaring Tool of Simple Design for Flaring the End of Copper Tubing

round rod or heavy wire to the shape shown in the drawing. The round stock selected should be just a little smaller in diameter than the inside of the tubing. To use the tool, grip one end of it in an ordinary bit brace or other hand drilling or boring tool.

Air Keeps Machine Clean

AS a result of the suggestion made by an employee at the Baltimore plant of the Glenn L. Martin Company, aircraft manufacturers, an ingenious attachment has been developed by which compressed air from the shop air line is used to keep the cutters on a milling machine free

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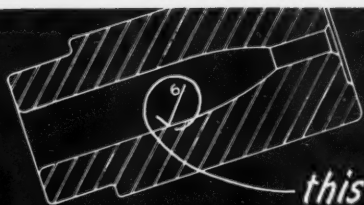
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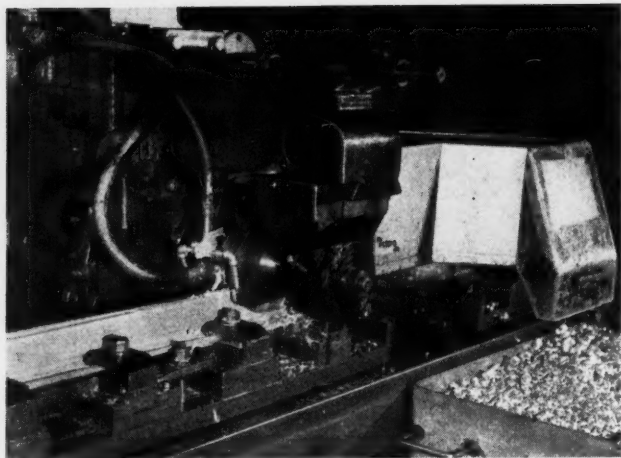
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MODERN MACHINE SHOP

227

July, 1944



Milling Machine
Equipped with an Air
Blast to Remove
Chips. The Chips are
Blown through the
Duct into a Mobile
Receptacle

from chips.

By using two sections of copper tubing attached to an air hose, twin jets of air are directed against each side of the milling cutter in such a

manner that the constant blast blows the chips away from the cutter and into a duct through which they pass into a mobile receptacle.
Prior to the use of this attachment, one man was kept busy brushing the chips from the machine so that the cutter would not become clogged. The new device has made this extra worker unnecessary, re-

SCREWDRIVERS

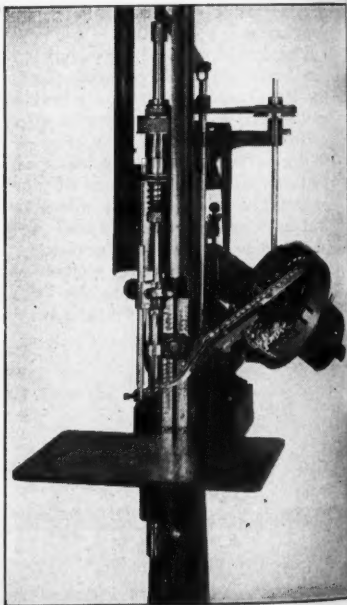
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MACHINES WILL DRIVE WOOD,
MACHINE AND SELF-TAPPING
SCREWS at ONE SECOND EACH

Send samples for production estimates

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SCREWDRIVER CO.**
2807 W. Fort St.
DETROIT 16, MICH.



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WOOD—ROCK MAPLE, 380 sq. in. per min. MAHOGANY, 432 sq. in. per min. PREG-WOOD, 1 3/8" thick, 76 sq. in. per minute.



PLASTICS — BAKELITE, 1/4" thick, 106 lin. in. per minute. SPAULDITE, 1/4" thick, 82 lin. in. per minute. INSUROK (below), 16 sq. in. per minute.

Cutting Speed up to 10,000 F.P.M.

Don't worry — the new DoAll Zephyr was developed especially for these lightweight metals, also for plastics, laminates, plymetals, alloys, wood, etc. Here's safe, smooth speed up to two miles a minute, supported in a Gibraltar-like housing of welded steel. Equipped with Speedmaster and Job Selector, for quick selection of proper saw and speed for each new job.

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157 Chambers St. New York N.Y. 6400 Fireman Ave. Detroit



230 MODERN MACHINE SHOP

lieving him for other, more important and more productive duties.

Screwdriver Bit for Pneumatic Tool

WHEN James Chivers of General Electric Company's Pittsfield Works assembly section found that frequent breakage of drop forged



Pneumatic Tool Fitted with Adapter and Screwdriver Bit

screwdriver bits was unavoidable, he found a way to reduce the expense of these tools to the minimum.

He devised an adapter, for use on pneumatic tools, the feature of which is a slot into which a screwdriver bit can be inserted. The bit is locked in position by means of a headless setscrew through the side of the adapter. Bits can be made to any size or width, to fit any size screw. When a bit breaks, the only part to be replaced is the bit itself.

July, 1944

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48,600,000 DAYS WASTED BY FALLS!

It is estimated that 270,000,000 man-days are lost each year because of occupational injuries, 18% being due to falls.

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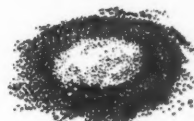
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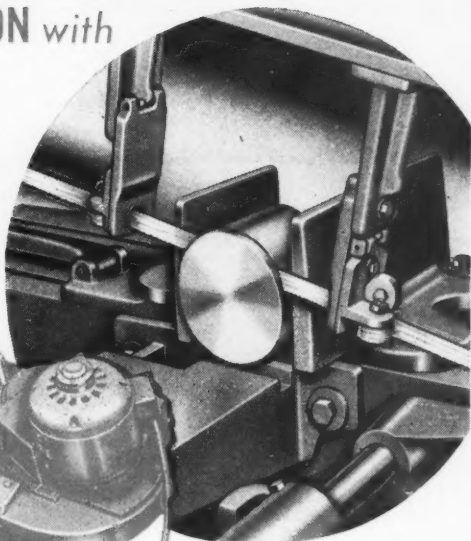
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MODERN MACHINE SHOP 233

News of the Industry

Labor-Management Relations Examined at Special Conference of AMA

The vital need for a re-examination of labor-management relations was responsible for an extraordinary interest in the Special Conference on Collective Bargaining called by the American Management Association at the Hotel Astor, New York City, on May 24th. More than 1200 employers and representatives of management gathered in the Grand Ballroom to hear the nation's foremost labor relations authorities discuss the various aspects of the current situation.

In opening the conference President Alvin E. Dodd of the AMA explained that the purpose of the conference was three-fold: (1) to summarize the philosophy and experience of the War Labor Board, (2) to present the collective agreement in action, giving executives an opportunity to discuss their own problems at a question-and-answer session, and (3) to present the War Labor Board's and Industry's views on the scope of collective bargaining.

The highlight of the conference was the dinner session, at which William H. Davis, Chairman of the National War Labor Board, defined the task awaiting industry after the war, and Thomas Roy Jones, President of the American Type Founders, Inc., stressed management's rights in collective bargaining.

In a speech which left a profound impression on the audience, Dr. Geo. W. Taylor, Vice Chairman of the War Labor Board, said "Management, labor, and the consumer have a tremendous stake in making collective bargaining work. Failure to meet that task may have very adverse results, for collective bargaining is only one of the drives of the common man which accepts the free enterprise system and with it management's functions and the profit motive.

"In the negative sense, collective bargaining is neither a grudging series of concessions by management nor a wringing of concessions by the unions; it is not a rear-guard action by either side. In

the positive sense, it may be held to be a way of industrial life, based on the conviction of the Wagner Act that there can be an industrial democracy.

"Both parties must preserve those rights which are necessary for the exercise of their function. Management must keep its right to discharge, directing the work force, pricing the product, and so on. On the other hand, union's request for union security is necessary for collective bargaining, and management should adopt a sensitive attitude toward union security. The development of security clauses has paid good and necessary dividends."

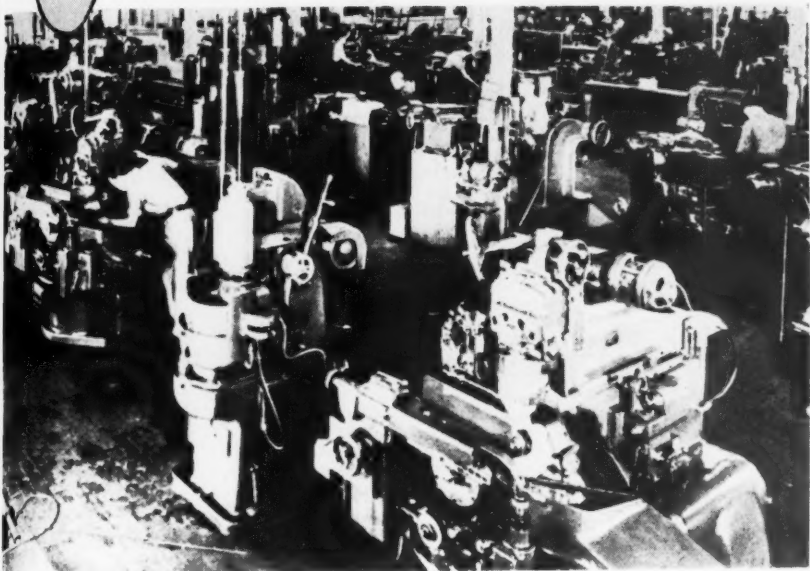
"Day-to-day collective bargaining under an established grievance procedure will give meaning to the mere statement of principles that are included in an agreement, and as time passes there will eventually be built up a series of precedents," said G. Allan Dash, Jr., in relating his experiences as umpire between the General Motors Corporation and the United Automobile Workers of America."

"There are four steps of processing grievances, which may be summarized as involving: (1) Presentation to the foreman, (2) appeal to the local plant management and shop committee, (3) appeal to a so-called four-man appeal board composed of two representatives of management and two regional union representatives, and (4) appeal to the umpire, whose decision is final.

"A survey of 69 of the 105 General Motors plants for a 15-month period ending late in 1943 showed that over 40,000 grievances were presented. Of these, 45.5 per cent were settled by foremen, 46.5 per cent by management shop committees, 7 per cent by the appeal boards, and less than 1 per cent by the umpire."

Speaking on application of Seniority Provisions, Elinore M. Herrick, Director of Personnel and Labor Relations, Todd Shipyards Corporation, said "Seniority rules are in direct conflict with efficient management. They often result in undue favoritism. If widely adopted they will turn millions of workers into casual, inefficient and dissatisfied laborers, many of whom will be a burden to the unions themselves."

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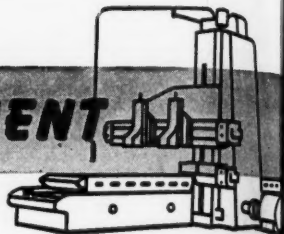
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July, 1944

MODERN MACHINE SHOP 235

NEW SHOP EQUIPMENT



Millholland Piston Drilling Machine

The Millholland Piston Drilling Machine illustrated herewith, product of the W. K. Millholland Machinery Co., 1048 Fairfield Ave., Indianapolis 5, Ind., is designed primarily for drilling piston pin holes in job lots.

The machine, as illustrated, will accommodate pistons from $2\frac{3}{4}$ to 6 inches in diameter and is of the double-end type, having two No. 4 Millholland automatic cam-operated drilling units mounted on opposite ends of a welded steel bed. The two drilling units have motors mounted on top, each with multiple V-belt drive to the spindle. Speed changes are effected by changing sheave pulleys. The automatic drilling units are mounted in bases and are adjustable for different diameters of pistons by means of

screws and micrometer dials.

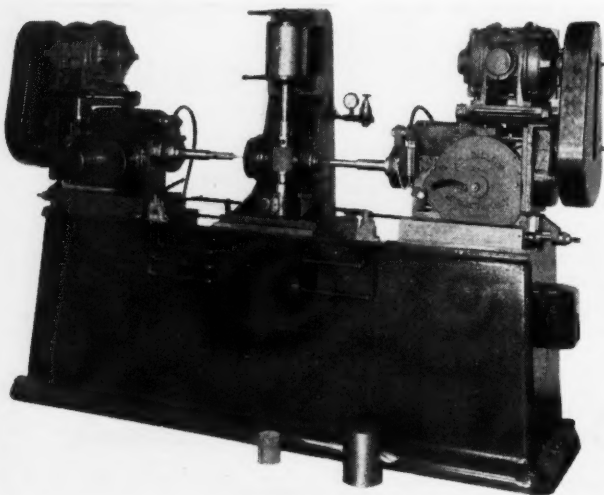
Feed changes are provided by splined pick-off gears which vary the ratio of drive from the spindle to the cam shaft. The machine is equipped with plate type cams which provide various increments of travel for drilling different lengths of piston bosses. The cams, which can be quickly changed by removing four bolts, are arranged to bring drills rapidly in contact with work. After the drills have passed through the pin bosses, the spindles are instantly returned to starting position by means of air cylinders located on top of the drilling units.

The work-holding fixture employed on the machine allows for locating piston from the open end, with V-blocks provided for squaring up piston by the pin bosses. An air-operated clamp is used to hold the piston rigidly against the adapter plate on the open end. In

order to accommodate different sizes of pistons, the machine is equipped with a hardened steel center post with vertical screw adjustment by means of a hand-wheel which is located inside the bed and can be easily reached by removing two screws from a cover on the bed.

The Millholland Piston Drilling Machine is semi-automatic in operation and is controlled by actuation of two conveniently located control valves—one for clamping the work and one

Millholland Piston Drilling Machine

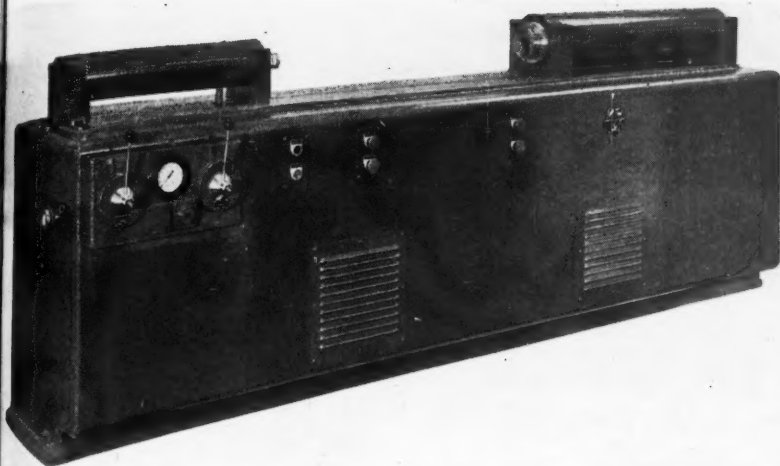




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July, 1944



Barnes 7 1/2-Ton Hydraulic Cold Drawing Machine

for starting the machining cycle. The fixture is provided with drill bushings mounted in anti-friction bearings which revolve freely with the drills, thus allowing for accurate drilling of the pin holes and also eliminating need for semi-finish boring operations since only sufficient stock is said to be left in pin holes for finish boring.

Barnes 7 1/2-Ton Hydraulic Cold Drawing Machine

The accompanying illustration shows a 7 1/2-ton hydraulic cold drawing machine developed by the John S. Barnes Corp., 301 S. Water St., Rockford, Ill. The drawing die is centrally mounted on the working table and supports the workpiece. After the work is set up, the machine cycle is started by depressing two "forward" push buttons simultaneously. A small cylinder ram at the left traverses forward and stops behind the die. The large ram at the right then moves forward, forcing the work through the die.

As the large ram moves forward, it exerts a differential load of five tons upon the work. The drawn piece upon leaving the die is steadied by the small ram. When the drawing operation is completed, "return" push buttons are depressed, causing the large ram to re-

turn to starting position. The dual push-button control system requires the use of both hands in operating the machine to provide for maximum operator safety.

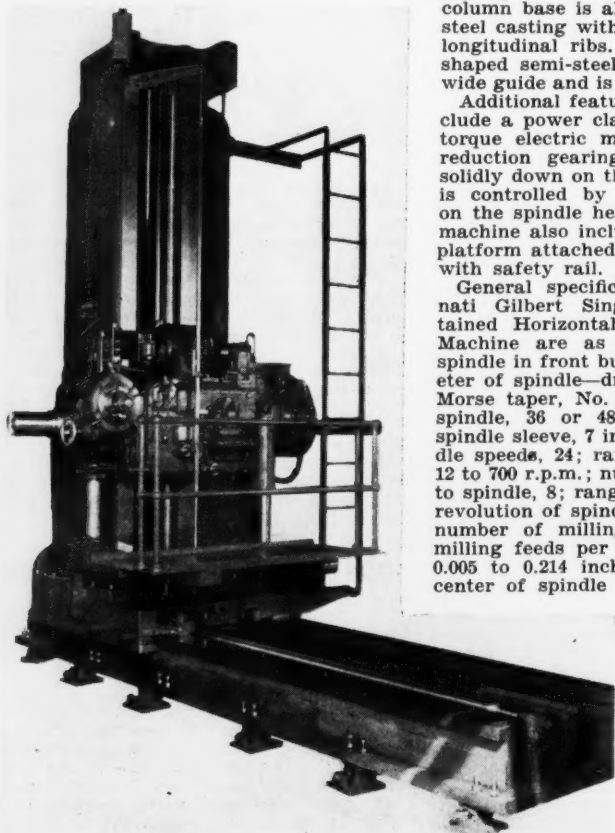
The dial pressure gage on the left front face of the machine clearly indicates the die loading throughout the drawing cycle. The two adjacent control handles operate speed control valves which provide for variable traverse rates up to 240 inches per minute. The hydraulic structures are unit mounted within the left end of the machine base, whereas the electrical control panel is located at the opposite end of the base. All equipment is accessible for servicing by the removal of sheet metal covers.

Cincinnati Gilbert Single Spindle Self-Contained Horizontal Drilling and Boring Machine

A single spindle self-contained horizontal drilling and boring machine especially designed for heavy duty drilling and boring operations requiring the use of a quill type spindle has been developed by The Cincinnati Gilbert Machine Tool Co., 3366 Beekman St., Cincinnati 23, Ohio. The head of the machine is a fully enclosed unit consisting of a quill type spindle with all necessary gearing.

shafting, bearings, and so on, for spindle speeds, drilling and milling feeds, rapid traverse, built-in reversible drive motor, and lubricating system.

The spindle is a hammered high carbon alloy steel forging which can be mounted in special phosphor bronze bushings or cylindrical roller bearings that are located in the ends of the feeding quill. The feeding quill also consists of an alloy steel forging which is heat treated and ground overall, and has a long non-relieved fit in housing bore. The outside diameter of the quill can be used for the purpose of attaching multiple drilling units, and so on. An efficient clamp is furnished for clamping the quill to its housing when the machine is used for milling.



The spindle speed change mechanism consists of only 17 gears for obtaining 24 speeds. The gears are finished by the cross shaved process after carburizing. After hardening, the gears are cross lapped. The driving sleeve is made of heat-treated alloy steel and is broached to fit the multiple splined driving end of the spindle. It is mounted on ball bearings.

The feed mechanism is driven by a helical tooth gear mounted on spindle sleeve, thus providing feeds expressed in inches per revolution of spindle. The unit features eight changes of feed, reverse mechanism for all feeds, and section mechanism for milling or boring feeds.

The column is a box-shaped semi-steel casting with four straight sides. The column base is also a box-shaped semi-steel casting with numerous lateral and longitudinal ribs. It is guided on box-shaped semi-steel runway by a 22-inch wide guide and is fitted with a taper guide.

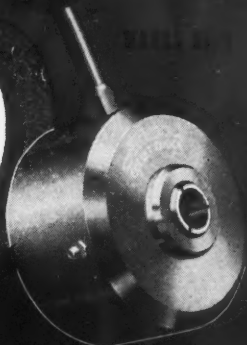
Additional features of the machine include a power clamp consisting of high torque electric motor driving sufficient reduction gearing to pull the column solidly down on the runway. The clamp is controlled by push buttons located on the spindle head. The design of the machine also includes a collapsible type platform attached to head and equipped with safety rail.

General specifications of the Cincinnati Gilbert Single Spindle Self-Contained Horizontal Drilling and Boring Machine are as follows: diameter of spindle in front bushing, 4 inches; diameter of spindle-driving end, 3½ inches; Morse taper, No. 6; continuous feed to spindle, 36 or 48 inches; diameter of spindle sleeve, 7 inches; number of spindle speeds, 24; range of spindle speeds, 12 to 700 r.p.m.; number of drilling feeds to spindle, 8; range of drilling feeds per revolution of spindle, 0.003 to 0.128 inch; number of milling feeds, 8; range of milling feeds per revolution of spindle, 0.005 to 0.214 inch; maximum distance center of spindle to top of runway, 28

inches; vertical travel of spindle head available, 60, 72, 84, and 96 inches; horizontal travel of column available, 60, 72

Cincinnati Gilbert Single Spindle Self-Contained Horizontal Drilling and Boring Machine

3 ALLISON COLLET CHUCKS



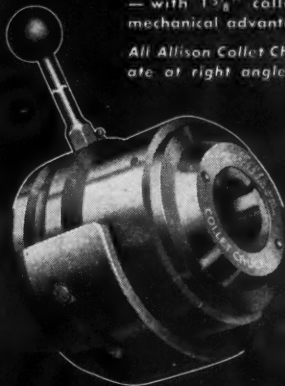
MODEL No. 1 For $1\frac{1}{2}$ " 8-thread spindle lathes — with $\frac{7}{8}$ " collet capacity — is unsurpassed as a combination chuck for either first or second operation work.

MODEL No. 2 For $1\frac{1}{2}$ " 8-thread spindle lathes — with $\frac{7}{8}$ " collet capacity — full circular low pressure cam activates the collet closing mechanism, thus giving any desired gripping pressure.

MODEL No. 3 For $2\frac{1}{2}$ " spindles and under — with $1\frac{3}{8}$ " collet capacity — has same mechanical advantages as the #2 chuck.

All Allison Collet Chuck closing handles operate at right angles to ways of lathe bed.

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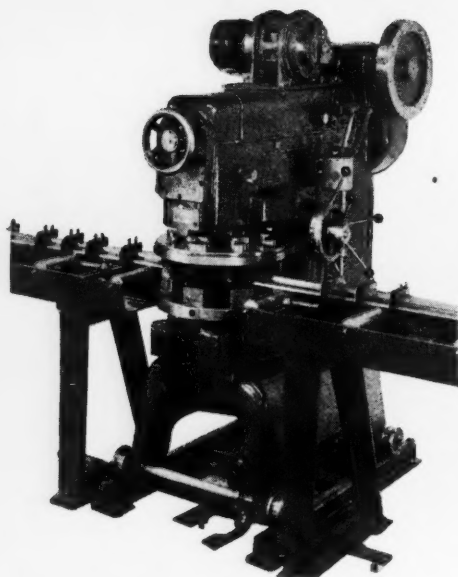
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Wiedemann Type R-5 Turret Punch Press

Type R-5 Turret Punch Press illustrated herewith is now being offered by the Wiedemann Machine Co., 1821 Sedgley Ave., Philadelphia 32, Pa.

The machine is also available in another model which is said to be ideally suited for the manufacture of special outlet and conduit boxes with knockouts. Neither model, however, is limited to these types of work since each is designed to accommodate a complete range of work from the thinnest sheet up to the capacity of the machine.

Specifications of the Wiedemann Type R-5 Turret Punch Press are as follows: Capacity, 1½-inch holes in ¾-inch mild steel or 4-inch holes in ⅝-inch mild steel; strokes per minute, 60; throat depth, 18 inches; number of stations, 12; pressure capacity, 80,000 lbs.; motor, 3 h. p., 1,200 revolutions per minute.

84, 96, 120, 144, and 168 inches; width of runway, 45 inches; height of runway, 14 inches; motor—reversible, 7½ or 10 h.p.; net weight of machine 60-inch vertical travel and 60-inch horizontal travel, 30,500 pounds.

Wiedemann Type R-5 Turret Punch Press

Especially adapted for use in fabricating copper, such as bus bars and similar pierced portions of electrical operating equipment, the Wiedemann

Progressive Model "C" Rocker Arm Welder

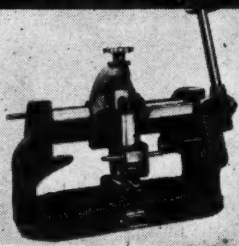
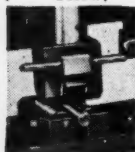
Designated as the Model "C," a rocker arm welder for the continuous spot welding of structural aluminum sections up to ⅝-inch Alclad has been brought out by the Progressive Welder Co., 3050 E. Outer Drive, Detroit 12, Michigan.

Designed to provide a production rate of from 1,000 to 2,000 spots per hour when welding heavy sections, the Model C features extremely rigid construction and has a maximum point rating of 6,500 lbs. (at 90-lb. factory air line pres-

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AUTOMATIC NUMBERING HEAD

(illustrated below)



The No. 9A Marking Machine numbers or marks with each forward and each backward stroke. Deep, clean marking or numbering of tubular and cylindrical parts including consecutive numbering is easily and efficiently accomplished. Write for literature.

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Punch Press

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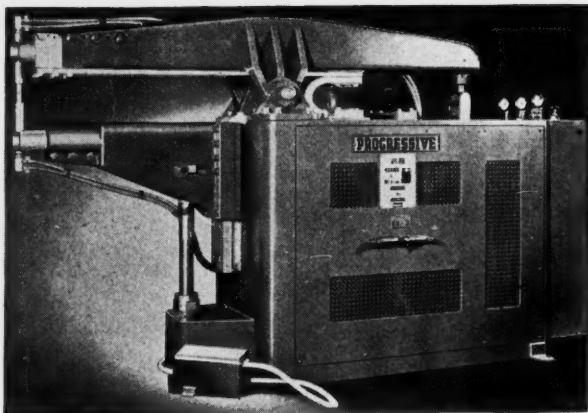
SHELDON MACHINE CO., Inc.

4250 N. KNOX AVE.

CHICAGO 41, U. S. A.

July, 1944

MODERN MACHINE SHOP 241



Progressive Model "C"
Rocker Arm Welder

of the unit being adjustable from 36 to 48 inches and the throat opening from 7½ to 17½ inches. In addition to a normal 1-inch working stroke, the rocker arm is also provided with a retracting stroke which affords a 4½-inch clearance between points to permit insertion of flanged work. This retracting stroke is controlled through one of the dual shrouded foot switches provided

sure). Due to the rocker arm design of the unit, any deflections occurring during the welding operation are said to be thrown into the vertical plane where they can be used to improve the weld by providing a "spring follow-up."

The Progressive Model C Rocker Arm Welder can be used for welding relatively large size work, the throat depth

with the machine.

Controls are provided for three different pressure conditions. Normal welding pressure is applied by depressing foot switch. Forging pressure is applied automatically. To apply light pressure for tip dressing, a toggle switch on machine is thrown and the foot switch depressed as for welding.

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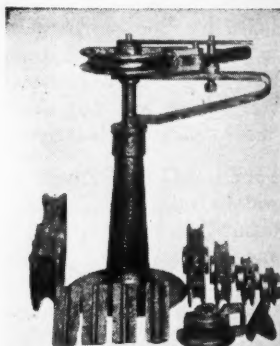
Bureau of Ships, Wash., D. C.; Henry J. Kaiser Co., Calif.; Pacific Bridge Co.; Bethlehem-Hingham Shipyards; Hercules Powder Co.; Stone & Webster Engineering Corp.; E. I. Du Pont de Nemours & Co.; Louisiana Shipyards; Westinghouse Elec. & Mfg. Co.; General Motors Corp.; Carnegie-Illinois Steel Corp.; Henry Ford Company.

Quick Deliveries

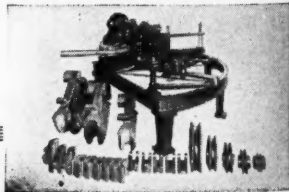
"**American**"

PIPE BENDING MACHINE
Company INC.

25 PEARL ST. BOSTON, MASS.



Write Air Mail for printed matter



Model "C"
Arm Welder

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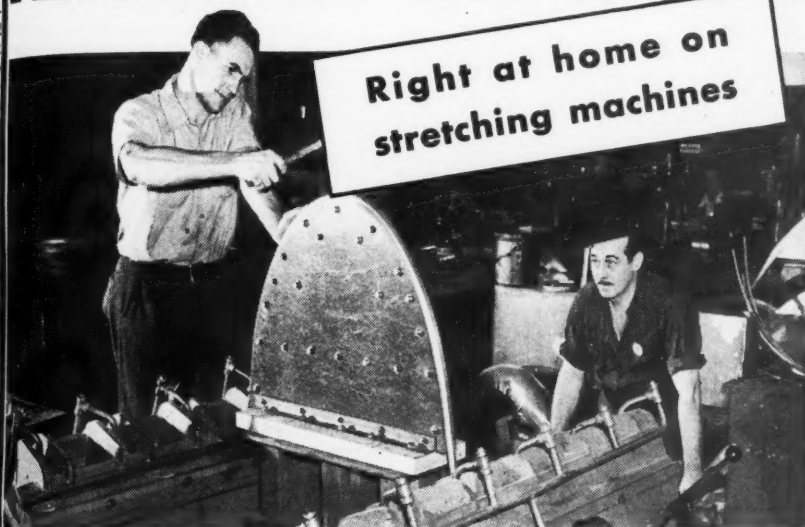
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MASONITE* DIE STOCK

Right at home on
stretching machines



Masonite Die Stock used in a stretch press to form aluminum strips at Fairchild Aircraft, Division of Fairchild Engine & Airplane Corporation.

MASONITE Die Stock is being used more and more for forms on stretching machines.

This is one of the ways in which this modern die stock is being employed by manufacturers throughout the country. It's a great time and money saver when used for special types of mating dies, forming blocks, templates, jigs and fixtures.

Remember, while Masonite Die Stock is only one-sixth the weight of steel, it has great compressive and flexural

strength. It can be fabricated in pattern or metal shops with great speed, and it stands up under present-day production requirements.

Masonite Die Stock is available in thicknesses of 1/4 to 2 inches . . . in sizes of 48 x 72 inches and 48 x 144 inches. If you want to know more about this amazing semi-plastic material, which is so easy to handle and will not shrink, check or twist, please mail the coupon.

*TRADE-MARK REG. U. S. PAT. OFF.
COPYRIGHT 1944, MASONITE CORP.

Awarded to Masonite Corp.
plant at Laurel, Miss.



MASONITE CORPORATION

Dept. MS-7, 111 W. Washington St., Chicago 2, Illinois

Please send me illustrative literature and complete information about Masonite Die Stock.

Name and firm _____

Address _____

City _____

State _____



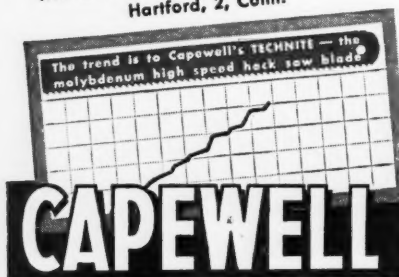


Capewell Band Saw Blades STAND UP LONGER

*Says Manufacturer of
Surgical Equipment for War*

This manufacturer, cutting both cold rolled and stainless steel, produces surgical cabinets, operating tables and naval galley equipment. On this type of work sawing operations are watched closely — and it was found that Capewell metal cutting band saw blades stand up longer . . . Try them on your tough job.

THE CAPEWELL MANUFACTURING CO.
Hartford, 2, Conn.



Saw Blades

HACK SAW BLADES • CONTOUR SAW BLADES
METAL CUTTING BAND SAW BLADES
WOOD CUTTING BAND SAW BLADES

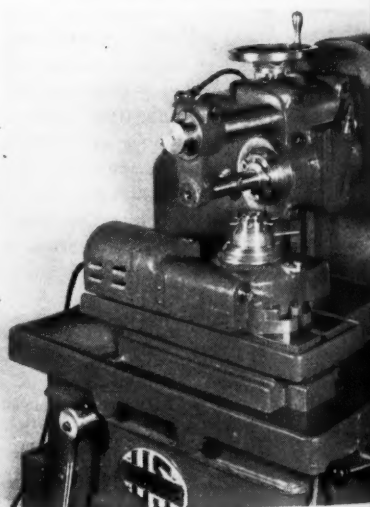
Upper and lower arms are designed to handle standard electrodes and holders although refrigerated welding points may also be used if desired. Electrodes may be mounted either vertically or at a 22½-degree angle. The latter position is not recommended, however, if the machine is to be operated at around its maximum pressure.

Transformers are of the pancake type with 600 turns. A four-position selector switch is furnished to allow for the selection of various turn ratios. Provision is made on the front of the base of the machine for mounting of the control panel furnished by the manufacturer of the capacitor discharge unit. Floor space occupied by the base of the machine is 35x66 inches, while the overall height of the welder is 5 feet.

U. S. Motor-Driven Automatic Indexing Fixture

A motor-driven automatic indexing fixture for use on milling machines is now being manufactured by the U. S. Tool Co., Inc., Ampere (East Orange) N. J. As shown in the accompanying illustration the fixture is a self-contained unit and can be readily installed on

U. S. Multi-Miller Equipped with Motor-Driven Automatic Indexing Fixture



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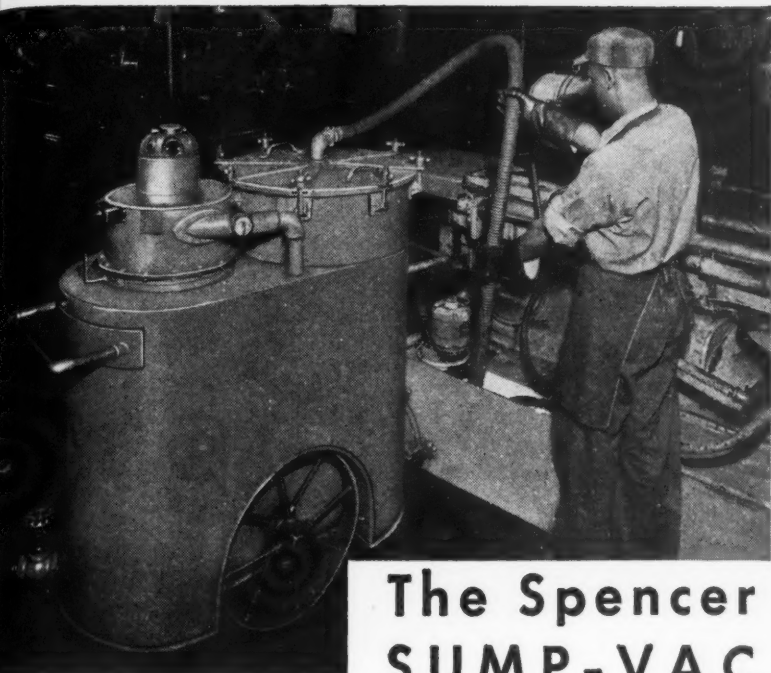
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The Spencer SUMP-VAC

Cleans Sumps in 2 to 10 Minutes

A portable vacuum producer with a 125 gallon tank, on wheels, picks up liquid at the rate of 40 gallons per minute. Machine emptied by gravity in 2 minutes or elevates liquid by pressure up to 6 feet.

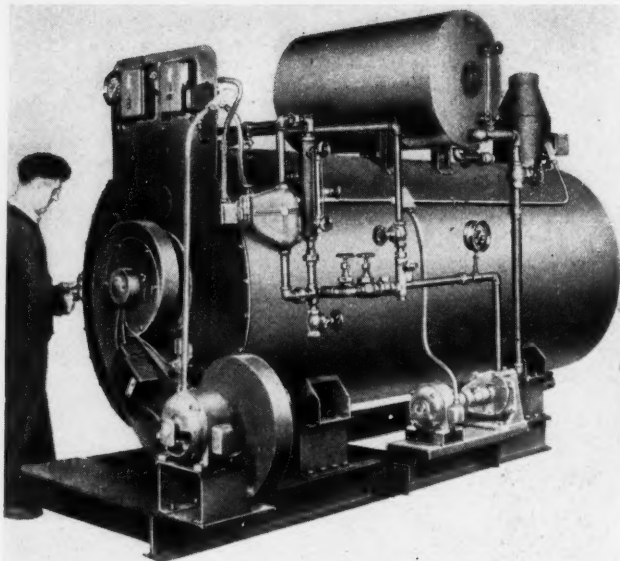
Filter basket collects chips, float valve prevents overfilling. No priming necessary. $\frac{3}{4}$ and $1\frac{1}{2}$ H.P. models. Ask for the bulletin.

SPENCER VACUUM HARTFORD CLEANING

THE SPENCER TURBINE COMPANY, HARTFORD 6, CONN.

MODERN MACHINE SHOP

16
245



O & S "Powermaster"
Steam Generating
Unit

power, or heating is now being manufactured by Orr & Sembower Inc., Reading, Pennsylvania.

Known as the "Powermaster," the unit features a three-pass construction which provides for quick steaming, high efficiency, and long boiler life. Since carbon collection is said to be reduced to a minimum by this three-pass construction, the unit requires little cleaning. However, when cleaning is necessary, easy access to the tubes is afforded by simply

milling machine by simply placing on table and bolting.

Standard equipment of the U. S. Motor-Driven Automatic Indexing Fixture includes one index plate, however, extra plates can be obtained if desired.

O & S "Powermaster" Steam Generating Unit

Said to develop 100 lb. pressure from 60-deg. water in 18 minutes or less, a fully automatic oil-firing steam generating unit for use in all industries where quick steam is needed for processing,

removing boiler backplate.

Another outstanding feature of the Powermaster is a special oil burner which gives a rotary motion to the flame. As a result of this fast-spinning motion, the flame "hugs" the walls of the combustion chamber, thereby assuring long gas travel and maximum heat transmission.

To provide for unusual compactness and easy installation, the Powermaster is equipped with a built-in condensate return system consisting of make-up tank, feed water gage, pump and motor. Return condensate or water direct from the supply line or both may be utilized as feed water.

HYBCO GRINDING HEADS

For Universal Tool and Cutter Grinders.

CHAMFER SHARPENING HEAD

Accurately Relieves Chamfers of TAPS—STEP DRILLS—CORE DRILLS—COUNTERSINKS—similar tools with evenly spaced flutes.

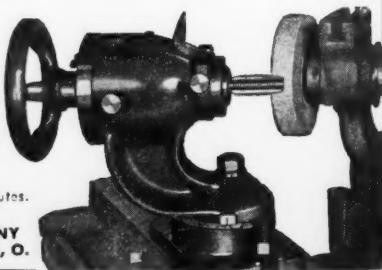


FLUTE SHARPENING HEAD

Sharpens Straight or Angular Flutes—GUN OR SPIRAL POINTS OF TAPS—Other tools with evenly spaced flutes.

Write for Circular GH

HENRY P. BOGGIS & COMPANY
1279 W. 3rd St., Cleveland 13, O.



Powermaster"
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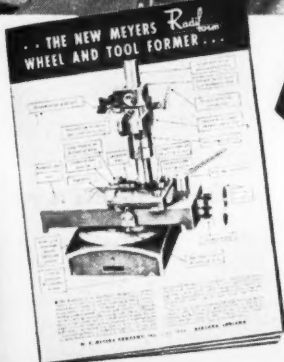
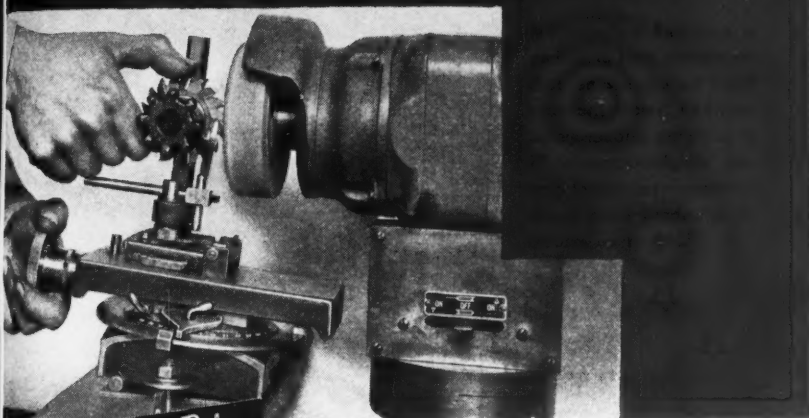


July, 1944

July, 1944

Radiform

TRADE MARK REG.

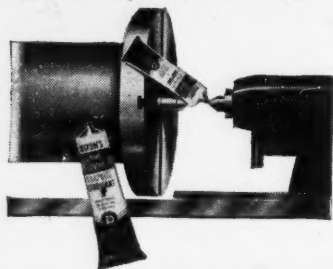


PAT.
PENDING

FREE . . . Illustrated Catalog and Operator's Manual

Actually a valuable text book on tool forming methods. Contains complete step-by-step operating instructions for forming carbide tipped as well as high speed steel tools directly against wheel—including precision radii on spiral fluted end mills and drills. No machine shop should be without this valuable guide. Write for free copy.

PROTECTION



against dead center WEAR

Excessive wear on the dead centers of your lathes may mean faulty set-ups, inaccurate work, slowed-down production.

DIXON'S LATHE CENTER GRAPHITE LUBRICANT

—minimizes friction at this point which results in decreased wear and replacement of centers. Invariably to some extent, it means decreased power consumption. It means more accurate work and increased production.

This product possesses unusual film strength to resist the severe conditions of pressure and heat as it lubricates. It is a non-fluid lubricant which can be quickly applied from the handy collapsible tube, thus eliminating the inconvenience of filling squirt cans, applicators or handling a brush or paddle. Does not harden or "skin over", even if long exposed to the air.

Available from supply houses in 1, 4, and 8-ounce tubes.



JOSEPH DIXON CRUCIBLE CO., JERSEY CITY 3, N. J.

Canada: Canadian Asbestos Company
Montreal • Toronto • Vancouver • Winnipeg

Ticonderoga, No. 635 and Microfyne Graphite

Pipe Joint Compound • Graphite Seal • Graphited Oils

Cup and Pressure Gun Grease • Gear Lubricants

Waterproof Graphited Grease • Auto-Marine Grease

Graph-Air Guns • Belt Dressing (Contains no Graphite)

Available in sizes from 10 to 100 h.p., the O & S Oil-Fired Powermaster is completely fire-tested and operated as a unit before shipment. To put into operation, the four services—electricity, water, oil, and steam—are simply connected. Electrical equipment is designed for 3 phase, 60 cycle current, 220 volts.

Acromark No. 9AMP Marking Machine

A pedestal type power-operated marking machine which can be adapted for marking flat or round workpieces is an-



Acromark No. 9AMP Marking Machine

nounced by The Acromark Co., 9 Morrell St., Elizabeth 4, N. J. The machine, which is designated as the No. 9AMP, is available with various accessories, including specially formed cradle rolls for holding cylindrical pieces of odd shapes or contours. Mandrels or stud mountings are available to hold hollow cylindrical parts for marking. Flat parts may be marked with a rotary type holder and an ingenious device which provides for accurate and automatic positioning of markings.

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July, 1944

OTC

TOOLS for MACHINE MAINTENANCE



SAVE YOUR MACHINERY from the CUTTING TORCH

Before using a cutting torch on valuable and hard-to-replace machine parts, try the OTC PULLING SYSTEM. It simplifies many heretofore difficult pulling jobs—removes bearings, gears, pulleys, shafts and other tightly fitted parts . . . quickly and and SAFELY! It cuts repair time, conserves man-power.

OTC TOOLS include GRIPOMATIC PULLERS (non-slipping . . . the harder the pull, the tighter they grip), PUSH-PULLERS, Puller Attachments, BOX WRENCHES, SLEDGING WRENCHES and Special Tools. Tell us your needs.

In War Service—OTC is a "four-time winner" of the Army-Navy "E" Award.

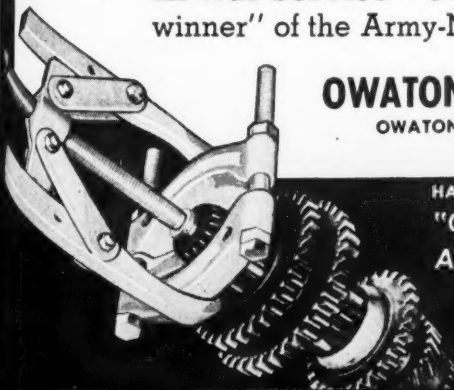
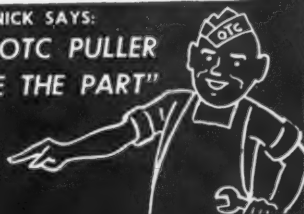
OWATONNA TOOL CO.

OWATONNA, MINNESOTA



HANDY McKANICK SAYS:

**"GET AN OTC PULLER
AND SAVE THE PART"**



Your Tapping Questions

When should I use a two-flute tap?

What is meant by per cent of thread?

Is the type of cutting oil important?

How much chip clearance should I allow in a blind hole?

Which holding fixture?

How can I get more tap life?

Answered

Precision tapping is a science in itself, and even an experienced operator will occasionally run into a snag. Our engineers are trained in the field. Draw on their experience and knowledge to reach a solution to your problem quickly and easily. Write for catalog. Send your questions to R. G. Haskins Co., 620 South California Avenue, Chicago, Illinois.



haskins

FIXTURE SHAFT EQUIPMENT

justable V-belt drive.

All controls of the Spitfire are arranged to make operation easy, particularly for women operators. Neoprene pads inserted between the bed and the base of the machine are said to absorb vibration and prevent distortion. Various fixtures which provide for quick and easy loading and unloading of the machine are available.

Aero Tool Large Size Micrometer Stop Countersink

Especially designed for the precision countersinking of large rivets, bolts, and screws, the Aero Tool Large Size



Aero Tool Large Size Micrometer Stop Countersink

Micrometer Stop Countersink illustrated herewith, product of the Aero Tool Co., Burbank, Cal., has a maximum countersinking capacity of $1\frac{1}{4}$ inches.

The tool, which is said to be capable of countersinking $\frac{1}{2}$ -inch rivets, is adjustable in increments of 0.001 inch and can be instantly and positively locked

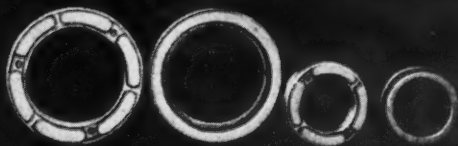
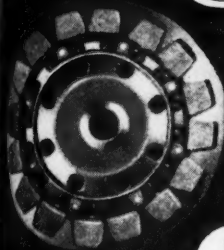
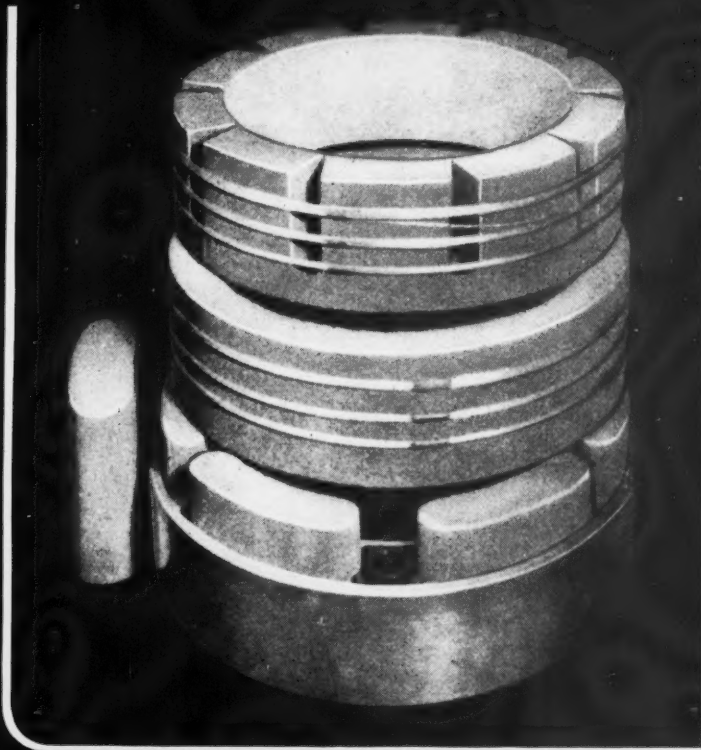
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BLANCHARD
WHEELS ON
BLANCHARD
GRINDERS



Blanchard Grinding Wheels are manufactured by Blanchard, for use on Blanchard Surface Grinders. These wheels may be plain CYLINDER wheels, SECTORED wheels, or SEGMENT wheels.

As builders of the machines, Blanchard knows the exact wheel requirements for each job. All wheels are constantly being tested in operation.

No expense or trouble is spared to produce the freest cutting and most uniform wheels possible. All wheels are selected for grade, by mechanical means, after manufacture. Blanchard Surface Grinders operate at highest efficiency with Blanchard Wheels.

The **BLANCHARD**
MACHINE COMPANY
64 STATE STREET, CAMBRIDGE, MASS.

Stop

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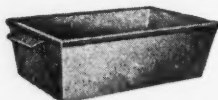


The Booklet contains in-
formation on the selection
of grinding wheels for all
kinds of work — sent
on request.

at each micrometer setting. Adjustments are made manually without the use of a tool and can be made while the countersink is in operation.

The Aero Tool Micrometer Stop Countersink is supplied complete with precision ground, heat-treated, high speed steel, interchangeable, 1-inch diameter cutter which is available in 72, 78, 82, 100, 110, and 115-deg. angles, with or without integral pilot. Radial bearings are bronze and thrust bearing ball type. Stop is spring loaded for positive action and safety.

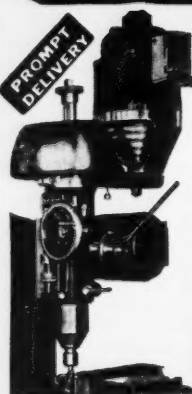
New Nesting Type Tote Pans



20" long x 12" wide x 6 1/2" deep.
16 ga., drag holes and handles both ends.

J. L. LUCAS & SON, INC.
Bridgeport, Conn.

MILLING - DRILLING - BORING ATTACHMENT for Heavy Duty Operations



EASY MOUNTING
LARGE QUILL—
4" TRAVEL

(counter balanced, hardened, and ground)

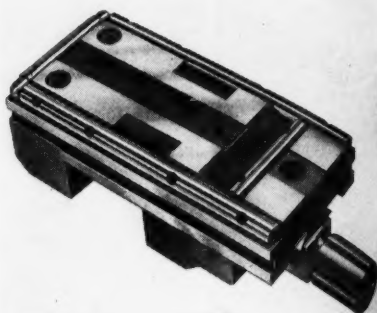
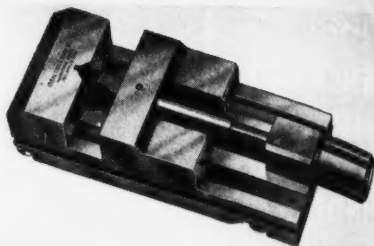
6 SPEEDS,
250-3000 RPM.

Lever and Worm Feeds
1/2 H.P. Motor

Specially engineered by RUSNOK to meet the demand for heavier duty end mill operations. Use many types of cutters on a wide range of work. Large size spindle (No. 9 B & S taper). Takes 3/4" to 3/4" end mills. Precision Engineered and Ruggedly Constructed Throughout.

Write for descriptive folder.

RUSNOK TOOL WORKS
4840 North Avenue, Chicago, Ill.



(Above) Ideal Model No. 2 "Anglemaster" Sine Vise. (Below) Ideal Model No. 3 "Anglemaster" Sine Vise

Ideal "Anglemaster" Sine Vise

Manufactured of high grade machine steel with all surfaces hardened to resist wear and seasoned, ground, and lapped to maintain accuracy, a sine vise for straight and angular working operations, to be known as the "Anglemaster," is now being marketed by Ideal Tool & Die Co., Inc., 733 Con-

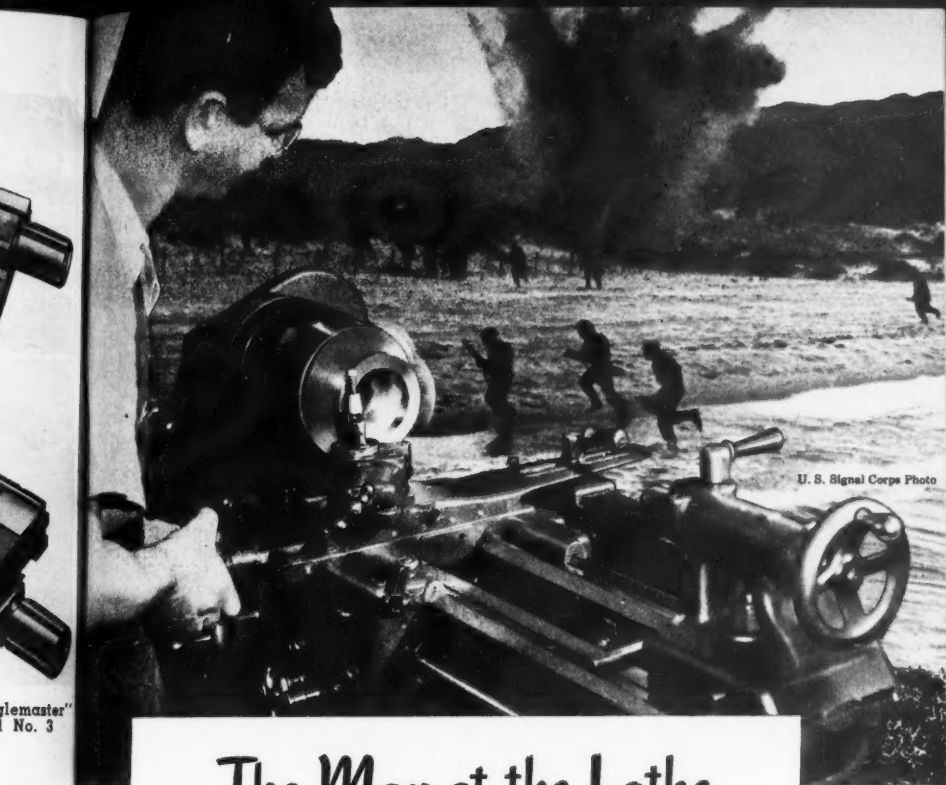
SEND US YOUR PRINTS FOR Quotations

THREAD GRINDING
BROACHING
MAGNETIC INSPECTION



TAYLOR
MACHINE COMPANY
MANUFACTURERS OF
AVIATION & AUTOMOTIVE PARTS
Gear Specialists

1917 EAST 61st ST. CLEVELAND 1, OHIO



U. S. Signal Corps Photo

The Man at the Lathe Fights Too!

...the Vise
...machine
...ed to re-
...nd, and
...a sine
...working
...“Angle-
...eted by
...733 Con-

...nd every turn of the spindle, as he guides
...work through many precision operations,
...ing Victory one step closer.

...spent at a lathe may lack the dangerous
...ment of combat—but the valorous men
...the battle fronts breathe a prayer of thank-
...for guns, shells, planes, tanks—for all
...superb equipment which is helping them
...ing the tide against the Axis.

...the man at the lathe is a soldier, too, as he
...his shoulders to the task of pouring out
...weapons in an ever-increasing
...stream. He faces his task grimly

...proudly...proclaiming by the gleam in his eye
...and the jut of his jaw that he will not be outdone
...in service to his country, and knowing that Ameri-
...ca's production is a decisive factor in the war.

To help America “tool up for Victory,” the output
...of South Bend Lathes has been increased (we
...can't say how much) in the last year and a half
...—giving the man at the lathe the efficient, de-
...pendable production weapon he must have to win.

There is a South Bend Lathe for every class of
...work—engine lathes, toolroom lathes, and turret
...lathes. Write now for our new catalog No. 100C in
...which the entire line is illustrated and described.

SOUTH BEND LATHE WORKS

South Bend 22, Indiana

Lathe Builders for 37 Years

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ON

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PARTS

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uly, 1944



gress St., Schenectady 3, New York.

Said to be ideal in tool, die, and gage rooms for surface grinding, layout and inspection work, the vise is available in two models designated as the Nos. 2 and 3. The Model No. 2, which is designed for tilting one way, is equipped with a pair of transverse sine rolls fastened to recesses in the base, parallel to the faces of the vise jaws. The rolls are so located as to be slightly below the surface of the base and consequently not exposed to wear when the vise is used for straight working operations. For angular work, either planer gage or size block placed beneath the inside roll raises or tilts the vise on end to the angle desired.

The Model No. 3 Anglemaster, which is designed for tilting three ways, is equipped with two pairs of sine rolls which are attached to recesses in the base in the same manner as in the Model No. 2. One pair of sine rolls runs longitudinally the length of the vise exactly 3 inches apart. The other pair of sine rolls runs transversely, parallel to the faces of the jaws and exactly 6 inches apart. Cutouts sloping

toward the rolls are provided for inserting planer gage or size blocks for tilting vise. The No. 3 is said to be especially designed to accommodate lengthy angular work, in which case the work can overlap the vise jaws on either side when work is clamped in line between the jaws.

In addition to the above-mentioned features, the Ideal Anglemaster Sine Vise includes a non-projecting, fully covered, telescoping screw; removable grip screw knob; and integral V-block. Specifications of the Model No. 2 are as follows: length overall (less screw knob), 6 inches; distance between sine rolls, 5 inches; width, $2\frac{1}{2}$ inches; height, $2\frac{1}{4}$ inches; travel of slide jaw, 3 inches; depth of jaws, 1 inch; net weight, $6\frac{1}{2}$ pounds; shipping weight, 7 pounds.

Specifications of the Model No. 3 are: length overall (less screw knob), $7\frac{1}{2}$ inches; distances between sine rolls, 5 inches and 6 inches; width, $3\frac{1}{2}$ inches; height, $2\frac{3}{4}$ inches; travel of slide jaw, $3\frac{1}{2}$ inches; depth of jaws, $1\frac{1}{4}$ inches; net weight, 14 lbs.; shipping weight, 15 pounds.



CRITERION *Boring Heads*

Original Accuracy Maintained

Noted for maintaining original accuracy over a longer period Criterion Heads are smooth, compact, rigid. Parts subject to wear are hardened. Lead screw is hardened tool steel, with threads ground from solid after hardening. All heads have large, graduated dial. Large offset adjustment eliminates need for offset boring bars. Two sizes: $1\frac{1}{2}$ " and 3". $\frac{1}{2}$ " and 1" bar capacity. Shanks are interchangeable, enabling operator to use head on different machines. Ideally adapted for slide boring tool holder on small turret lathes. Ask your dealer or order direct. Request free literature.

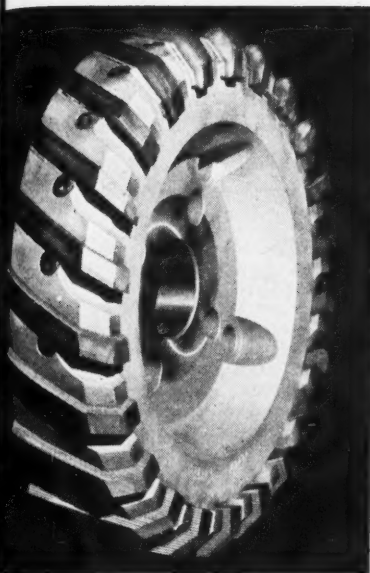
Lead Screw ground from solid AFTER hardening.

C CRITERION MACHINE WORKS

BEVERLY HILLS, CALIFORNIA

Immediate Deliveries

ON THESE INGERSOLL FACE MILLS

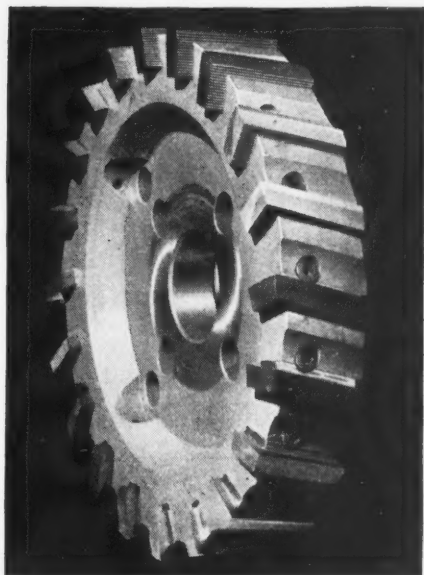


SHEAR CLEAR (Above) Heavy Duty face milling cutters will out perform any other designs for work in tough steel and soft, stringy, non-ferrous metals. Designed for $\frac{1}{2}$ " deep cuts. The Shear Clear patented design using steep negative rake and positive shear angles which cause chips to curl outward away from the cutter. The following sizes with high speed steel blades are available in stock both right and left hand:

Cutter No.	Diameter	No. Blades	Price
8104X	4"	12	\$58.00
8106X	6"	16	75.00
8108X	8"	20	100.00
8110X	10"	22	120.00

TYPE NX (Below) Heavy Duty Series face milling cutters designed for general purpose work are suitable for taking $\frac{1}{2}$ " cuts on both the face and periphery in cast iron or steel. Serrated high speed steel blades are blocked in the cutter housing by wedges and screws. Chip clearance is milled in the housing to prevent chips clogging on heavy cuts. The following sizes are available in stock both right and left hand:

Cutter No.	Diameter	No. Blades	Cutting Face on Periphery	Price
8104X	4"	10	1- $\frac{3}{4}$ "	\$30.00
8106X	6"	10	2- $\frac{1}{2}$ "	35.00
8108X	8"	14	2- $\frac{1}{2}$ "	45.00
8110X	10"	18	2- $\frac{1}{2}$ "	60.00
8112X	12"	20	2- $\frac{1}{2}$ "	78.00



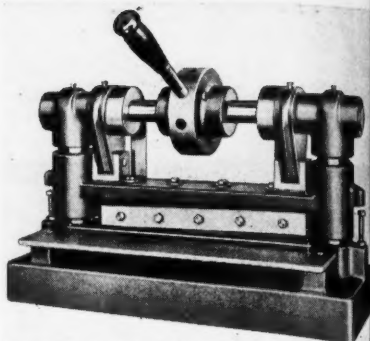
THE INGERSOLL MILLING MACHINE CO. ROCKFORD ILLINOIS

Di-Acro Shear No. 3

Further changes and improvements in the design of its Di-Acro Shear are announced by the O'Neil-Irwin Mfg. Co., 306 Eighth Ave., S., Minneapolis 15, Minn. Designated as the No. 3, the newly designed shear includes a precision adjustment for accurately stopping blade travel, thus permitting the shear to be readily adapted to a wide variety of slitting and notching operations.

A metal stripping guide moving with the shear blade allows the Di-Acro Shear No. 3 to be employed for stripping all types of materials (within the capacity of the unit) to extremely narrow widths. A chute built into the unit is said to provide for positive delivery of all materials into receptacle as fast as they can be sheared.

The Di-Acro Shear No. 3 is of unusually heavy and rugged construction. The main bed casting, which is made of machine tool grey iron, weighs 80 lbs. and is said to afford an extremely sturdy foundation for the shear. The complete unit weighs in excess of 150



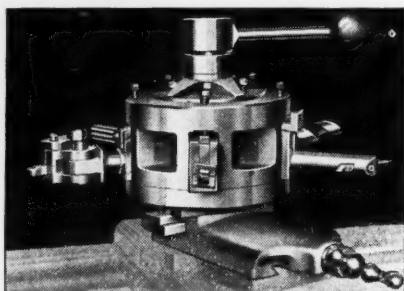
Di-Acro Shear No. 3

lbs., with all moving parts properly weighed and balanced to distribute shearing load.

All bearings are fully adjustable for wear and alignment and rifle drilled for complete lubrication to all points of friction. Both shear blades are fully adjustable for tolerances in shearing as well as for the control of the angularity of pitch, which can be quickly varied.



5 STATION LATHE TURRETS FOR THE POST-VICTORY YEARS



Send for complete folder of details

OUR NEW IMPROVED TURRET HEADS are a Vital war-time necessity in machine shops and plants today. Also Vital for your Post-War planning where COMPETITION will be so keen — tomorrow. For the Victory years ahead, order now, equip your machine shop or plant with OUR NEW IMPROVED TURRET HEADS.

5 TOOLS IN POSITION for INSTANT CHANGE

ALLOWING MINUTE ADJUSTMENTS WITH 10 ACCURATE TOOL POSITIONS

Made in Four Sizes 9" to 30" Swing



132 CHARLES STREET,

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SHEFFIELD DIAL INDICATOR SNAP GAGE

FOR INSPECTION AND CLASSIFICATION

1 Gage may be used with dial either at the bottom or the top, whichever is more convenient.

2 Dial is adjustable radially and can be swung through 360° to facilitate reading.

3 Scale has a range of .005"—each graduation .0001".

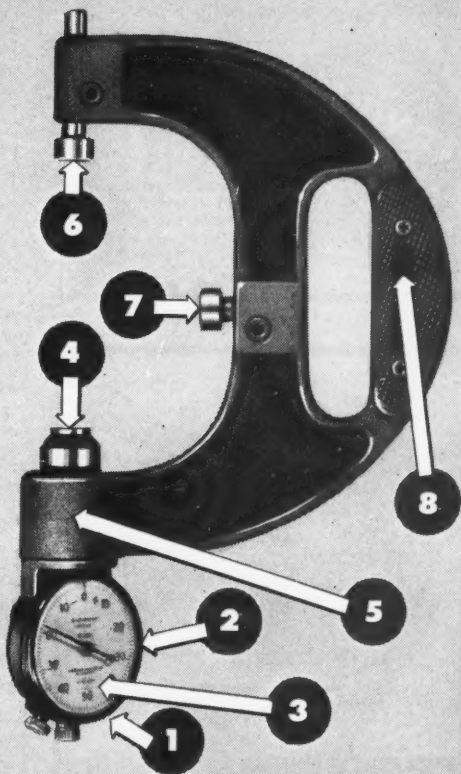
4 Movable anvil is spring urged for constant gaging pressure, but spring has no effect on indicator. Special spring pressures available.

5 Movable anvil bearing is long enough to preserve alignment with the fixed anvil.

6 Fixed anvil is adjustable to a maximum of one inch.

7 Adjustable backstop has a cylindrical face for accurate line contact.

8 Comfortable handle with plastic grip to insulate gage from heat of inspector's hand.



THE SHEFFIELD CORPORATION

Dayton 1, Ohio, U.S.A.

MACHINE TOOLS — GAGES — MEASURING INSTRUMENTS — CONTRACT SERVICES

as desired for the shearing of all types of materials ranging from heavy steel sheet and spring tempered materials to the lightest of fabrics and tissues. Maximum shearing capacity of unit, 18 gauge steel plate (0.048 inch); maximum shearing width, 12 inches.

Harvey Gauge-Master

A device for use in making precision depth and inside measurements with an ordinary micrometer caliper has been



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AIR TAMER
BLOW GUN**

Light puff or a full blast at your fingertips. Airtight construction throughout. Stands up to the toughest use. Write . . .

C. A. Norgren Co., 220 Santa Fe, Denver 9, Colo.

Norgren



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ROLL MARKERS

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LOGOTYPES
DIES
STANDARD

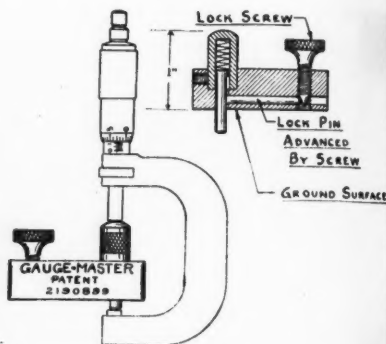
AND SPECIAL STAMPS
INSPECTORS' STAMPS

MACHINE ENGRAVING
PRECISION DUPLICATING

NEW METHOD STEEL STAMPS, Inc.

149 Joseph Campau, Detroit 7, U.S.A.

developed by L. H. Harvey Associates 254 First Ave. N., Minneapolis, Minn. Known as the Gauge-Master, the device consists of a hardened steel block, $\frac{1}{2}$



Harvey Gauge-Master

inch wide x $\frac{1}{2}$ inch high x 2 inches long, near one end of which is mounted a hollow head containing a coil spring. This spring actuates a measuring pin extending through the ground under-surface of the block and held in position by a horizontal pin controlled by a thumb lock screw.

In use, the measuring pin is forced down by the spring until it seats itself. The pin is then locked by the thumb screw and a reading taken from the top of the head to the tip of the measuring pin with a micrometer caliper.

When the measuring pin is locked flush against the ground surface, the release of a Lock Allen permits the spring to force the head upward for instantaneous setting to the micrometer. For use with a 2-inch micrometer, the head is set 1 inch above the ground surface



DRILL THESE HOLES

BY A QUICK, EASY, INEXPENSIVE METHOD

Your business letterhead will bring literature.

WATTS BROS. TOOL WORKS
Wilmerding, Pa.

For Smoother Performance

USE ATLANTIC Contour Cutting BAND SAW BLADES



You will welcome Atlantic Band Saws in your shop. The teeth are set to permit a smoother performance for radius cutting. The special alloy steel insures longer wear and you can weld them easily.

IMPROVED PACKAGE

One of the strongest, most practical and convenient boxes on the market. Cutaway feature shows inventory at a glance.

Box is solid chipboard construction that won't come apart. Saw securely held in coil form, no bothersome wires to cut. Required lengths freely removable. Marked on end as well as top of box for easy identification. Packed in all widths $3/32''$ to $1/2''$ wide in 100' lengths. Number of teeth as permitted by W. P. B. ruling.



Send for Atlantic Band Saw Booklet

ATLANTIC SAW MFG. CO., Inc.

Manufacturers of Metal Cutting Band Saw Blades Exclusively
155 Brewery St., New Haven, Conn.

and depths to 1 inch can be measured with the two interchangeable pins supplied with the Gauge-Master. For a 1-inch micrometer, the head is set $\frac{3}{4}$ inch up and depths to $\frac{1}{4}$ inch can be measured.

Measuring pins are standard $\frac{3}{32}$ -inch drill rod. Longer pins can be made by the user to measure greater depths. Readings can be taken with an ordinary scale if micrometer precision is not required. The Gauge-Master can also be set to a micrometer reading and used as a "go" and "no go" gage.

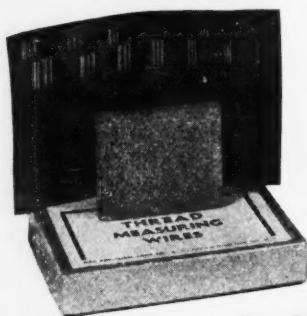
DoAll Economy Gage Block Set

An economy set of 37 DoAll gage blocks is now available from Continental Machines, Inc., 1306 S. Washington Ave., Minneapolis 4, Minn. The gage blocks are packaged in a newly designed pocket-carrying case which holds the blocks on end for ease in handling and identifying. The position in which each block is held also prevents grit and dust from settling on the polished surface. The case measures $7\frac{1}{2} \times 4 \times 2$ inches, thus enabling it to be easily fitted into inspector's shop-coat

pocket ready for instant use.

The DoAll Economy Gage Block Set includes two 0.050-inch wear blocks in addition to five standard series of gage blocks. The first series consists of nine blocks 0.1001 to and including 0.1009 inch in increments of 0.0001 inch; the second series, nine blocks 0.101 to and including 0.109 inch in increments of 0.001 inch; the third series, nine blocks 0.110 to and including 0.190 inch in increments of 0.010 inch; the fourth series, five blocks 0.100 to and including 0.500 inch in increments of 0.100 inch, and the fifth series, three blocks 1.0, 2.0, and 4.0 inches. These blocks, when wrung altogether, provide an overall length of 11.7995 inches. With this overall length any measurement from 0.050 to 11.7995 inches, in increments of 0.0001 inch, can, it is claimed, be made with millionth accuracy using various size blocks in combination.

The gage blocks are available in sets of two qualities. Set "A" "Inspection Quality," is guaranteed in height, flatness, and parallelism accuracy to within plus or minus 0.000004 inch at 68 deg. F. Set "B" "Working Quality" is guaranteed in height, flatness, and parallelism accuracy to within plus or



ARCTOOL
PRECISION GROUND

Thread Measuring Wires

A Toolroom Necessity

The **ARCTOOL** wire kit offers an assortment of 14 precision ground wire sizes for checking the measurement of any type and size of screw up to $3\frac{1}{2}$ threads per inch. Put up in simulated leather "wallet," the kit comes equipped with cork mounting block and chart of standard screw threads and formulas for determining the pitch diameters of any type of thread.

Price 250

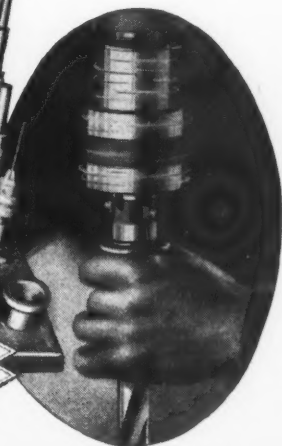
SCHULTZ & ANDERSON CO.

110 EDISON PLACE, NEWARK 5, N. J.

KEEP SPINDLES TURNING

with Wizard Quick-Change Chuck and Collet Outfits

On multi-operation drill-press jobs, WIZARD Quick-Change Chuck and Collet Outfits keep spindles turning. Tools can be changed without stopping or slowing the spindle. To insert a tool, the operator merely pushes the collet into the revolving chuck, and the positive automatic latch instantly locks the tool in place. Releasing is just as quick and easy. WIZARD Chucks hold tools rigid and centered, an exclusive McCrosky feature. And with the protection given by WIZARD Friction-Drive Tapping Collets, the operator can bottom-tap safely at drilling speed. For full information write to McCrosky, MEADVILLE, PENNSYLVANIA.



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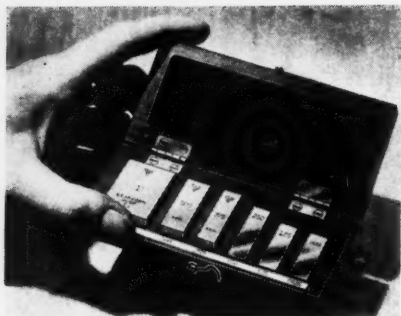
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July, 1944

MODERN MACHINE SHOP 265



DoAll Economy Gage Block Set

minus 0.000008 inch at 68 deg. Fahrenheit.

All blocks are made from special analysis steel to provide long-wearing qualities. Each block is scientifically heat treated, seasoned, and processed to ensure the absence of internal stresses, warping, growth, or shrinkage. Each block has a hardness of 65 Rockwell "C" and is clearly etched with dimensional size and serial number.

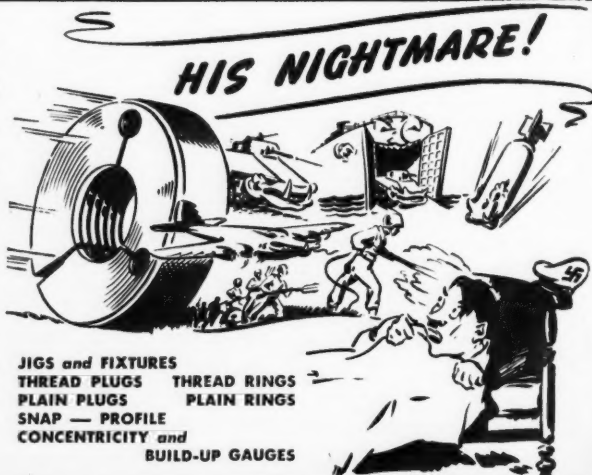
Duplex Die and Punch Filing Machine

A machine which can be readily adapted for performing both die and punch filing operations, to be known as the Duplex Die and Punch Filer, is now being offered by Ideal Tool & Die Co., Inc., 733 Congress St., Schenectady 3, New York.

Said to be ideal for filing and lapping otherwise inaccessible surfaces, the machine is equipped with two 10-inch square tables which are accurately ground to accommodate the average run of dies and punches. When the machine is to be used as a die filer, the upper or die table is swiveled into working position. The file holder operates from below the table, with the file penetrating the die. The die table may be set to any compound angle up to 15 deg. toward the rear and both sides and up to 45 deg. toward the front.

When the machine is to be used as a punch filer, the upper table is tilted out of the way and the lower or punch table is then ready for use in performing filing operations. The punch file operates from the top but does not

Mass production, in which Master Gauges have played their part, has made possible the giant military preparations that is causing Axis' jitters.



MASTER GAUGE CO.

2206 FENKELL AVE.

Phone: University 3-7676

DETROIT 21, MICH.

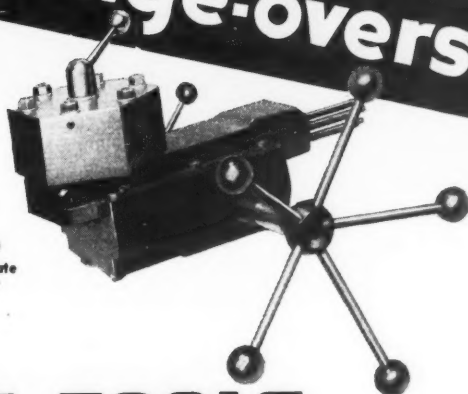
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change-overs



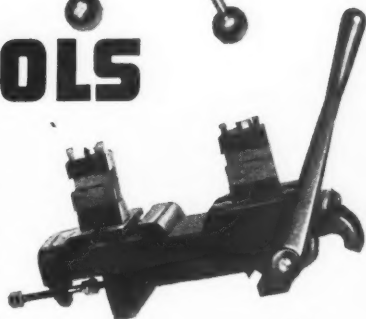
\$197.50
Immediate
Delivery

UTILITY TOOLS

In a matter of minutes you can convert your engine lathes into screw machines. Simply remove tail stock and install a Utility Turret and Crossfeed Cut-off. Turret has rack and pinion which assures steady feed. Raised bearing surface eliminates all chip trouble. Has two taper gibs for take-up and alignment. All ways and bearing surfaces are ground. All inserts, bushings and pins are hardened and ground. Hex is $5\frac{1}{8}$ " across flat, 2-7/16" thick. Accommodates a $\frac{3}{4}$ " hole or a No. 1 or 2 Morse taper. Fits Logan, South Bend, Atlas, Craftsman, 10" Sheldon, Clausen, etc.

Cross Slide pictured here has rack and pinion, two tool holders with adjustable jacks. Weight approximately 40 lbs.

Collet Closer parts are hardened and ground. Full ball bearing. Only wear is on ball bearings. Write for detailed literature.



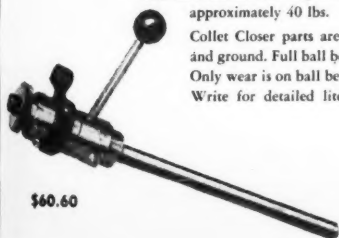
\$55.00



TOOL and DIE MFRS.

1370 West Washington Blvd.

LOS ANGELES 7, CALIFORNIA



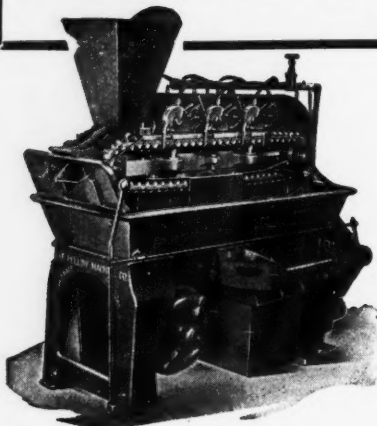
\$60.60

CH.

July, 1944

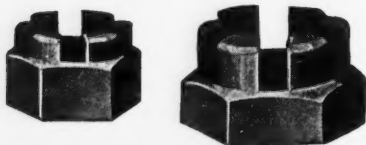
MODERN MACHINE SHOP 267

NUT SLOTTING MACHINERY



Two continuously operating conveyors. Highest obtainable production. Automatic indexing. Automatic burr removal. As high as 3000 slotted nuts per hour. All sizes from $\frac{3}{8}$ to 15/16 hexagon across flats. Used by all larger nut makers.

SLOTS 2 SIZES AT ONCE

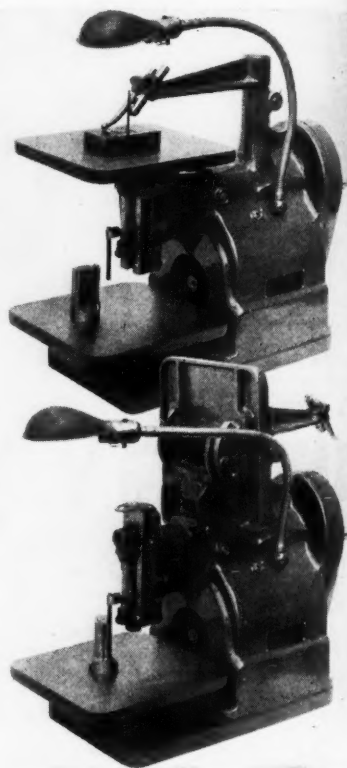


PELLOW

MACHINE CO.

13510 Foley, Detroit 27, Mich.

penetrate the table. Instead, the depth of the file movement can be accurately controlled through a stroke adjustment means. Thus the machine can be arranged to file just the punch section down to the flange or the full length of a blind hole. The punch table may be



(Above) Duplex Die and Punch Filing Machine arranged for die filing operations. (Below) Duplex Die and Punch Filler arranged for punch filing

swiveled up to 10 deg. toward the front or rear.

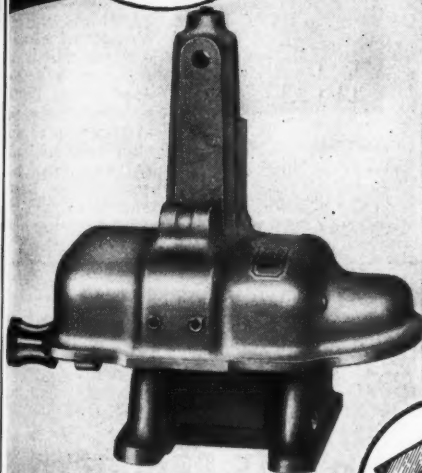
The file support of the Duplex Die and Punch Filing Machine is of a recessed design, and the file holders are guided in prismatic ways with adjustable gibbs. The ball-bearing crank drive is fully adjustable to provide stroke of from 0 up to $1\frac{1}{2}$ inches and

the depth
accurately
adjustment
can be ar-
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le may be

Today machine shops must be equipped to grind odd-shaped forms. To do this precisely requires dressing the abrasive wheel to the desired contour. No. 41 does that, accurately, quickly.

**Introducing
No. 41
Contour, Radius
and Angle
Dresser**

At Last... It's Possible!
Now Even the Operator of Limited
Experience Can Dress and Re-dress
ABRASIVE WHEELS
Accurately and Quickly to
ANY CONTOUR!



No. 41-B Template Dresser. Rear View.

After the wheel is dressed by the chisel-pointed diamond, it fits the template accurately. When worn, it is quickly re-dressed to the same contour.

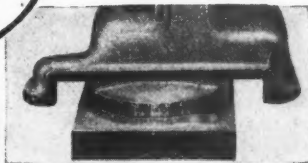
With its base, No. 41-A does all the usual jobs of a quality radius and angle dresser. Yet its cost is remarkably low.

Write for Booklet B. Limited Territories Open.

**Plus regular radius
and angle Dressing**

Virtually any desired contour can be generated on abrasive wheels by placing a template of the curve in the clamp of No. 41-B. A spring-activated plunger follows the contour of the template as the operator simply turns the knob. As he turns it, the chisel pointed diamond of the dresser moves across the face of the rotating abrasive wheel, dressing it exactly to the shape of the template.

Flexibility, accessibility of parts for cleaning, and simplicity are among the features of No. 41-A Radius and Angle Dresser made possible by expert engineering design.



No. 41-A Radius and Angle
Dresser. Front View.



BEST TOOLS CORPORATION
ROCKVILLE CENTER, LONG ISLAND, N. Y.

can thus be set to meet a wide range of depth requirements.

Standard equipment of the machine includes 1/6 h. p., 110-volt, single-phase, 60-cycle motor fully enclosed inside frame; cable and switch; two-speed V-belt drive under hinged guard; flexible light in ball socket, and set of wrenches. Motors for other currents can be furnished as extra equipment. Regular machine files can be used on the Duplex, while punch files cut to file on the downward stroke only are available on special order.

Specifications of the Duplex Die and Punch Filer are as follows: size of tables, 10 inches square; depth of throat, 9 1/2 inches; upper file length, 6 inches or more; lower file length, 3 inches maximum; speeds, 350 and 525 strokes per min.; bench space, 10x22x20 inches high; net weight, 150 pounds.

"Master" Collet Chuck

A collet chuck of unusually large capacity, to be known as the "Master," has been placed on the market by United Industries, 8344 Second Blvd.,



"Master" Collet Chuck

possibility of stock slippage. A hand lever provided can be used to engage or release the collet without stopping the

Detroit, Mich. Designed for installation on lathes, screw machines, grinders, and other units requiring the use of a chuck, the Master is available in four standard sizes of 3/4, 1, 1 1/4, and 2 inches round. Special larger sizes without limit as to dimensions can also be furnished.

The Master Collet Chuck utilizes a collet of special design which is actuated by hardened steel balls, producing a powerful gripping action that is said to prevent all

CRITERION
Diamond TOOLS

Accelerating **WAR PRODUCTION**

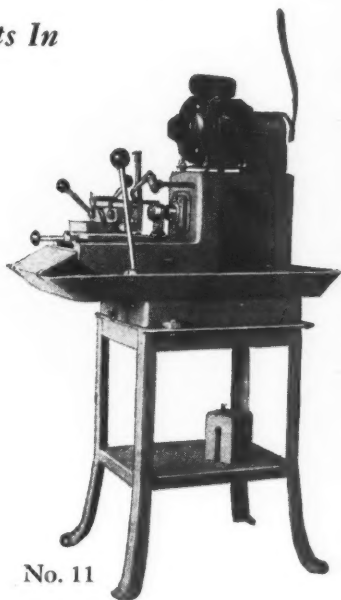


Speed your output with Criterion Diamond Tools. The kind of service they give is responsible for the swift, steady increase in their use. Quality of diamonds employed plus a unique method of setting assure extreme rigidity and extra tool life. Special tools made to order following blueprints or specifications. Sharp-pointed, selected thread grinding tools. Ask your dealer or order direct. Request free literature.

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BEVERLY HILLS, CALIFORNIA

Geometric Precision Threading Machine

For Threading Duplicate Parts In Quantity Production



Primarily for small diameter, fine pitch threads up to 5/16" diameter. May also be used on finer pitches up to 9/16".

This is a bench machine which is equipped to drive from a light socket connection, making the machine portable, and we can furnish it with or without the table shown in the picture.

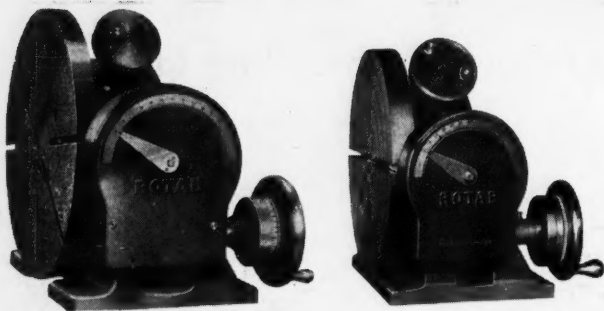
No. 11

We can equip this machine with a standard two-jawed vise or a standard collet holding device, or you can make your own work holding device to suit your job.

Waist high controls and quick holding devices, vertical and horizontal alignment, automatic gage, quickly removable oil hood and splash guard, easy accessibility to all working parts makes this machine easy to operate and saves time. Class 3 Fits are assured.



THE GEOMETRIC TOOL COMPANY
NEW HAVEN 15, CONN.



12 and 24-Inch
"Rotabs"

workhead. The chuck is precision built, with all working parts hardened and ground.

12 and 24-Inch "Rotabs"

To broaden the scope of applications for its "Rotab" (rotary table), Machine Products Corp., 6773 E. McNichols Rd., Detroit 12, Mich., has developed two new sizes of this unique device; name-

ly, a 12-inch and a 24-inch model. The compact design of the 12-inch model is said to be particularly adapted to milling operations and lends itself to easy mounting on the table of a milling machine. Rigidly constructed, the unit weighs 125 lbs. The 24-inch model can be adapted to a wide range of milling and boring operations, and its listed weight is 688 pounds.

Like the original Rotab (36-inch), each new model has a rotating table to which the work is clamped and which can be turned to any degree and made to assume any position radially. In addition, its plane can be fixed to any angle from the vertical to the horizontal and even to a position 30 deg. in the opposite direction without disturb-



Standardized Set-up appliances

FOR MACHINE TOOLS

Why Force Your Men to waste time on machine tool set-ups when CAD Standardized Appliances will convert this non-productive time into productive labor? Why Ruin Machine Table Slots with ordinary bolts when CAD Bolts are designed to fit T Slots? The CAD Bolt is a standard machine table bolt, made of steel with full smooth threads, ready for use when you receive it.

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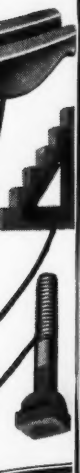
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FOR BULLETIN A-72**



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SET-UP APPLIANCES for MACHINE TOOLS
8177 Tincum Ave., Philadelphia 42, Pa.**

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CHINE TOOLS
Alphie 42, Pa.

July, 194

ARBORS and ADAPTERS

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SETUP

IN SPEEDING UP PRODUCTION

... save time by having individual
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Standardized taper Arbors and Adapters
for all machines having National Stand-
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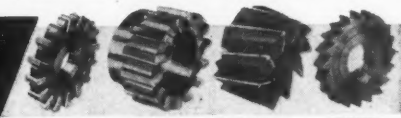
Ball End Mill Arbors • Cutter
Chucks • Conversion Adapters
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Saves and Sockets
Centering Plugs
Cutter Mounts
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Accessories

Write for Arbor Catalog No. 450
containing detailed information.

**Scully-
AND COMPANY JONES**
1901 SOUTH ROCKWELL STREET • CHICAGO, U. S. A.



SOLID SPACING COLLARS ADJUSTABLE SPACING COLLARS ARBOR BEARING SLEEVES



MILLING CUTTERS (Beveled Teeth) SHELL END MILLS (Beveled Teeth) SHELL END MILLS (Solid Type) WOODRUFF KEYWAY CUTTERS

ing the initial clamping of the work, the manufacturer claims.

Both models have dials with degree and minute graduations which register the angle of setting. Adjustable degree rings under the faceplates provide for elimination of excessive turning of hand-wheels in order to obtain zero settings. Sine bars are furnished for use in cases where greater accuracy of angular settings is required. The tables, which are hand scraped, may be locked at any desired positions—radial or angular and can also be disengaged for rotating freely by hand.

U. S. HEADS

STANDARD SINCE 1915



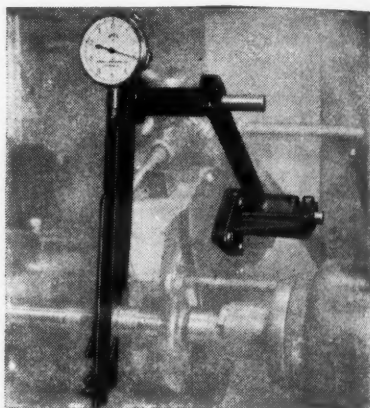
Two Spindle Head
Both Spindles
Adjustable

The United States Drill Head Co.

1954 Riverside Drive
CINCINNATI, OHIO

Stuart Micromatic Visual Grinding Gage

As a means for performing precision grinding operations with maximum speed, ease, and accuracy, Clawson & Bals, Inc., 4701 W. Lake St., Chicago.

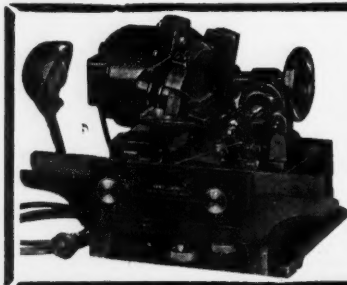


Stuart Micromatic Visual Grinding Gage

Ill., is now offering the Stuart Micromatic Visual Grinding Gage shown in the accompanying illustration.

The gage is arranged so that it can be applied to and removed from the work while the machine is in operation. The dial indicator guides the operator as the work is ground to size. According to the manufacturer, the gage indicates the correct size even though the sizing controls of the machine may be worn. Grinding tolerances of plus or minus 0.0001 inch are said to be easily maintained with the gage.

The construction of the Stuart Micro-

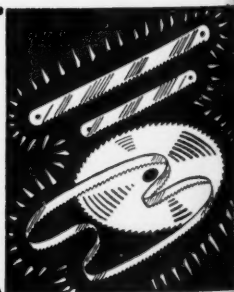


KEENER CUTTING SAWS

Sharpen your hack, band, or slitting saws on a Howe-Lindsey Automatic Saw Sharpener and increase their life at least six times.

Write for Folder.

HOWE & SON, Inc.
HINSDALE, N. H.

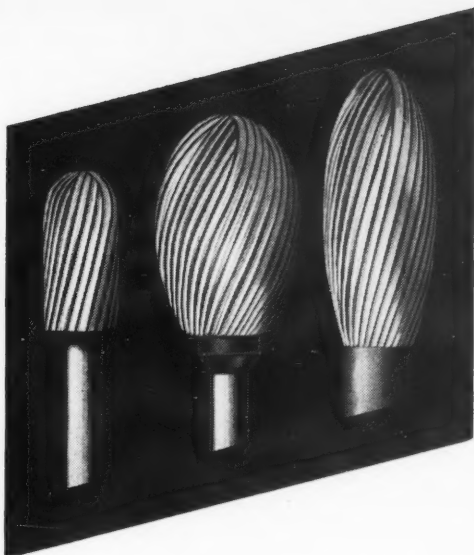


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maximum
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July, 1944

Here are four Pratt & Whitney machine-ground burs. If you are a bur user, they probably look familiar because they have the same general shapes found in ordinary hand-ground burs. But the resemblance stops right there.

Human Element Removed: Pratt & Whitney burs are *machine ground* from solid. Each one is a precision cutting tool — every flute spaced *exactly* with relation to all others — each cutting edge with precisely the *correct rake* — all *teeth identical* in height and chip clearance. And every bur is ground *concentric*, to run true on its shank. There is no guesswork or human error in these burs . . . they didn't just "grow," like the garden-variety of hand-ground bur. Our special bur-grinding machinery takes out all the human error — assures you of smoother operation, smoother results in finished work, greater production per hour and per bur.

More For Your Money. Try Pratt & Whitney Kellerflex Burs on your next order. They will give you more for your money because each one is precision made on special machinery designed by Pratt & Whitney engineers for the purpose.

PRATT & WHITNEY
Division NILES-BEMENT-POND COMPANY
KELLERFLEX SALES DIVISION
WEST HARTFORD 1, CONN.

MODERN MACHINE SHOP 275

matic Gage includes no gears, levers, or angles. The dial is actuated by direct parallel thrust. Contact points of the caliper measuring bar are of tungsten carbide to provide for long wear.

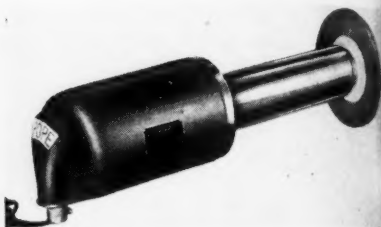
The Stuart Micromatic Visual Grinding Gage is made in two models with ranges of $\frac{1}{8}$ to $1\frac{1}{4}$ inches and $\frac{5}{8}$ to $2\frac{1}{2}$ inches, respectively. Additional calipers for the larger model provide ranges of 2 to 5 inches and 5 to 8 inches.

Pope Motorized Grinding Spindle

Pope Machinery Corp., Haverhill, Mass., announces the development of a motorized grinding spindle employing a G-E motor operating in a sealed housing. The spindle is said to include construction features that assure the production of exceptionally fine surface finishes and at the same time speed up the grinding operation where surplus metal is to be removed. With its specially designed General Electric motor, the unit delivers a full 1 h.p. at the wheel.

The Pope Motorized Grinding Spindle is equipped with large SKF super-precision double-row roller bearings which

are fully protected against dust and dirt, and an extra heavy shaft. The spindle can be operated horizontally, vertically, or at any desired angle. The

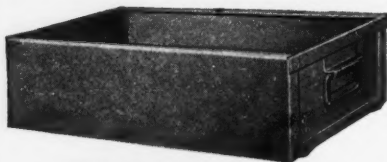


Pope Motorized Grinding Spindle

design of the solid shaft extension can be readily varied to provide for mounting of special tool-holders or standard drill chucks.

Constructed primarily for installation on 6x18-inch surface grinders, the Pope Motorized Grinding Spindle can also be used on boring mills, planers, milling machines, and other machine tools for special work.

Immediate Shipment STEEL BOXES For YOUR PRODUCTION NEEDS



STYLE 300 STACKING BOX



STYLE 600 STACKING BOX

Prices F.O.B. Factory, Philadelphia—Any Quantity! Order Today—Write, Wire or Phone.

AMERICAN METAL WORKS, INC.

1501 GERMANTOWN AVENUE

PHILADELPHIA 22, PA.

Just right for your small parts. Light in weight, easy to handle. Equipped with drop handles each end. Runners save wear on bottom of box and act as positive stacking lock.

No. 301—6" x 9" x 3½"—20 ga., \$.55 Ea.
No. 302—8" x 12" x 4"—20 ga., .60 Ea.
No. 303—9" x 13½" x 4½"—19 ga., .75 Ea.

An ideal all-purpose shop box. Sturdy all-welded construction. Heavy skids act as positive stacking lock and reinforce box at point of maximum wear.

No. 601—10" x 16" x 6"—18 ga., \$.95 Ea.
No. 602—12" x 18" x 8"—16 ga., 1.25 Ea.

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2, PA.

July, 1944

PLAN-O-MILLING



FAST, ACCURATE MILLING OF CYLINDRICAL FORMS

You get the speed and high production of special purpose equipment when you replace wasteful, obsolete machines with Plan-O-Mill.

Yet Plan-O-MILL is flexible. A slight tooling change adapts it to a wide variety of thread milling and form milling jobs.

Plan-O-Mill saves manpower too! It is semi-automatic, can be operated by semi-skilled or unskilled labor. One man or woman can operate two or more Plan-O-Mills.

Find out about Plan-O-Mill today! Contact your machinery supplier or write direct.

PLAN-O-MILL CORPORATION

1511 East Eight Mile Road • Hazel Park, Michigan

July, 1944

MODERN MACHINE SHOP 277

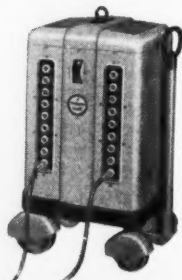


It's always open season for this kind of fishing . . . and the big ones don't get away from the progressive tool and die shops that go after them with the smooth, flawless welds of MARQUETTE equipment.

MARQUETTE'S country-wide staff of weld-experts will give you free "guide service" by bringing you the latest developments in welding and showing you the amazing advantages of its application to the fabrication of all kinds of tools, dies, jigs and fixtures. Electric welding saves expensive, hard-to-get tool steel by hardsurfacing only the cutting edges.

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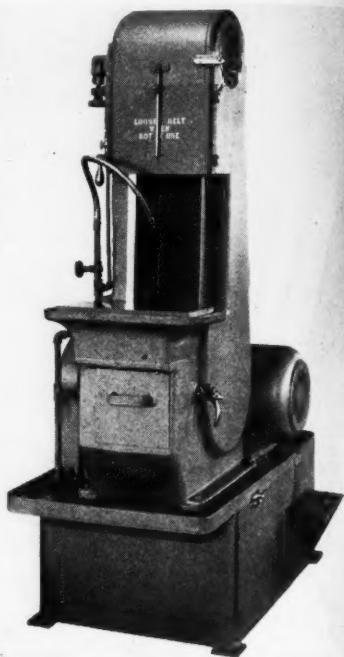
MARQUETTE

REGISTERED U.S. PAT. OFFICE

A.C. ARC WELDERS

Porter-Cable Model AG-8 Wet Belt Grinder

To meet the demand for a high speed wet belt grinding machine with large coolant capacity and unusually rigid construction for maximum grinding accuracy, the Porter-Cable Machine Co., 300-5 Wolf St., Syracuse 8, N. Y., has brought out the Model AG-8 Wet Belt



Porter-Cable Model AG-8 Wet Belt Grinder

Grinder illustrated herewith.

The machine is equipped with a 35 gallon self-contained recirculating pump system, thus making an abundance of coolant readily available for all grinding operations. According to the manufacturer, work can be ground to tolerances as close as 0.0005 inch on the machine even with inexperienced operators.

In addition to the above mentioned features, the Porter-Cable Model AG-8 Wet Belt Grinder includes a readily accessible waste cleanout drawer; new "Joggle" type switch for easy tracking of belts; high table for maximum oper-

AG-8

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N. Y., has
Welt Belt

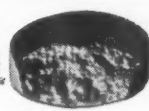
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July, 1944



**This Is What Happens
When Sweating Robs
the Body of Salt . . .**



QUICK DISSOLVING
(Less than 30 Seconds)

This is how a Morton's Salt Tablet looks when magnified. See how soft and porous it is inside. When swallowed with a drink of water, it dissolves in less than 30 seconds.

Case of 9000, **\$2.60**
10-grain salt tablets
Salt-Dextrose tablets, **\$3.15**
case of 9000 - - - -



MORTON'S DISPENSERS

They deliver salt tablets, one at a time, quickly, cleanly — no waste. Sanitary, easily filled, durable.

800 Tablet size - - - - - **\$3.25**

Order from your distributor or directly from this advertisement . . . Write for free folder.

MORTON SALT COMPANY, Chicago 4, Ill.



July, 1944

ator convenience; flexible tube to provide coolant where needed, and large platen grinding area.

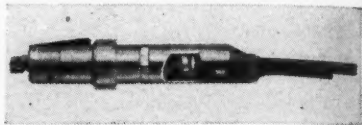
The Model AG-8 can be used for grinding steel, aluminum, bronze, magnesium, glass, plastics, fiber, hard rubber, ceramics, and so on. Heating, warping, discoloring, flowing, or chipping of material being ground is said to be eliminated.

Keller No. 000-F Model 1416 Pneumatic Filing Tool

Designated as the No. 000-F Model 1416, a pneumatic filing tool for use in the production of die-casting dies, plastic molds, airplane and other parts requiring fine finish filing is announced by the Keller Tool Co., Dept. MMS, Grand Haven, Mich. By substituting a hack saw blade for the usual file, the tool can also be used as a portable power saw for making irregular cuts.

The design of the No. 000-F Model 1416 pneumatic filing tool includes a 000 Keller rotary air motor together with a cam and piston utilizing a ball bearing assembly to transfer the rotary

motion of the motor to the reciprocating motion to the file. The use of a standard ball bearing set at angle of 27 deg. with a cam angle of 25 deg. assures contact between the cam and the outer ball race, while the inner race is

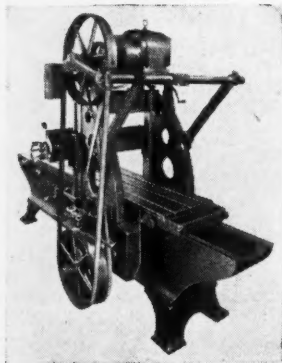


Keller No. 000-F Model 1416 Pneumatic Filing Tool

fixed to the piston and does not contact the cam surface. In this manner, wear on the cam and piston is materially reduced and lubrication and maintenance are simplified.

According to the manufacturer, the Keller No. 000-F Model 1416 Pneumatic Tool runs cool even under heavy load and is therefore comfortable to handle. The tool has a free speed rating of 1,500 strokes per minute and fixed length of file stroke of 7/16 inch.

MASTERDRIVES for PLANERS Eliminates Lineshafting



Now you can have added flexibility in plant layout, because Masterdrive eliminates lineshafting and permits placing planers wherever you wish.

The drive is supported by four supports. Each of these require the drilling and tapping of four holes. Once supports and horizontal bars are in place, motor base and outboard bearing support can be moved laterally to line up with pulleys. Your present ceiling lineshaft pulleys are used on the motor counter shaft.

A single complete installation with Masterdrive — one responsibility. Write today for details of planer or other Masterdrive applications.



MASTER ELECTRIC CO.
INDUSTRIAL EQUIPMENT DIVISION • DAYTON, OHIO

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LEACH External Grinder

PRICE
\$875.00
Fully Equipped

Grinds Work
from $\frac{3}{4}$ " to
11" in length
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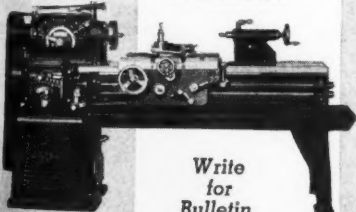
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LATHES
15" AND 16"**

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Modern Design—
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MACHINE TOOL CO.**

ATLANTA • OHIO, U. S. A.



No. 120 High-Speed Steel Heat-Treating Furnace

A low cost furnace that is unexcelled for
heat-treating high speed steels, for hard-
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Reaches 1500°
in 5 minutes.



Compact, powerful and
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13 $\frac{1}{2}$ " long, 7 $\frac{3}{4}$ " wide,
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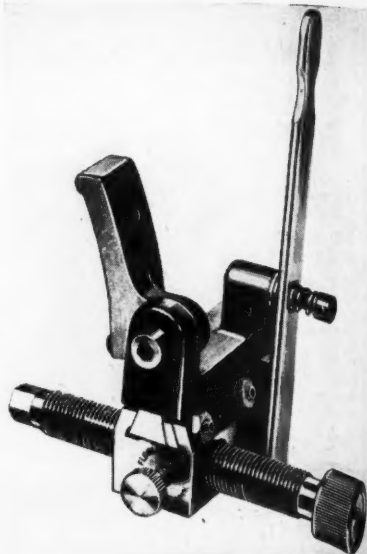
JOHNSON GAS APPLIANCE CO.,
623 E. Ave. N. W., Cedar Rapids, Iowa.
Please send me Free Johnson Catalog.

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Address.....
City.....
State.....

July, 1944

Florian "Jiffy" Wheel Dresser

Known as the Florian "Jiffy," a grinding wheel dresser for mounting on tool-room surface grinders is announced by the American Standard Co., Southington, Conn. Designed so as to become an integral part of the grinder on which it is mounted, the unit is said to be always ready for wheel dressing regardless of the relative position of the wheel to the table. According to the manufacturer, the dresser can be used without disturbing the work setup and is quickly adjustable for accurate dressing.

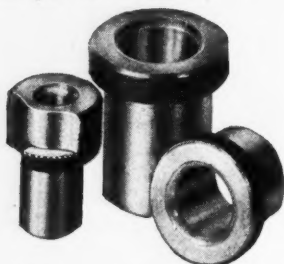


Florian "Jiffy" Wheel Dresser

Easy to install, the Florian Jiffy Wheel Dresser is constructed to fit all standard surface grinders and is supplied complete with detachable diamond.

Precision DRILL JIG BUSHINGS

Behind this line are the special skills and experience derived from the successful manufacture of "Precision" Collets . . . On a production basis for the first time, "Precision" Drill Jig Bushings have been made widely on special order for two years.



Immediate delivery from stock on all important sizes . . . Write us for catalog.

GENERAL DIE-STAMPING-TOOL COMPANY
262-272 Mott St., New York 12, N. Y.

Lincoln 200-Ampere "Shield-Arc" Engine-Driven Arc Welder

An engine-driven arc welder rated at 200 amperes has been added to the line of "Shield-Arc" welding machines offered by The Lincoln Electric Co., Cleveland.

Produce with SAFETY!

It pays to protect your operators by equipping your punch presses with

STRAND Enclosure Safeguards

Easily installed. Adjustable to any size die. Quickly changed for any set-up. Write for circular.

STRAND MFG. CO., INC.

SAFETY ENGINEERS

156-62 N. Desplaines St.

Chicago 6, Ill.



Gear Specialties

SPURS — HELICALS (14 to 96 D.P.)

BEVELS — (straight and spiral)

WORM GEARING — THREAD GRINDING

This range logically embraces the gear components of many critical control devices essential to the war effort and this organization is proud of its contributions of such material in the program.

With full production capacity scheduled far into the future, all new inquiries are now necessarily subordinated to these vitally important prior commitments. However, every urgent need will be given careful consideration.

Gear Specialties

MANUFACTURERS
CHICAGO

SAVE TIME

ON BORING - TOOL SETTING

Take one trial cut, mike it, and use this gage to move the tool the exact additional amount required. Or, working from the O.D. of the bar, set the tool to exact position without a trial cut.

USE THE BARTELT PEDESTAL MICROMETER

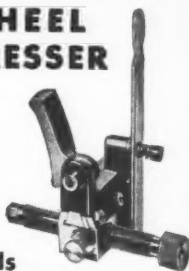
Time wasted in conventional cut-and-try methods can be eliminated. Inexperienced operators learn to do satisfactory work more quickly. Three models available—Model B, with two-slide pedestal, shown.

USEFUL FOR MANY OTHER JOBS

Bartelt Pedestal Micrometers are also excellent for height and depth gaging, for inspection work of various kinds, and for other set-up operations. Write for circular giving full information.

Jiffy

WHEEL DRESSER



**A 5 Minute
Job in 5 Seconds**

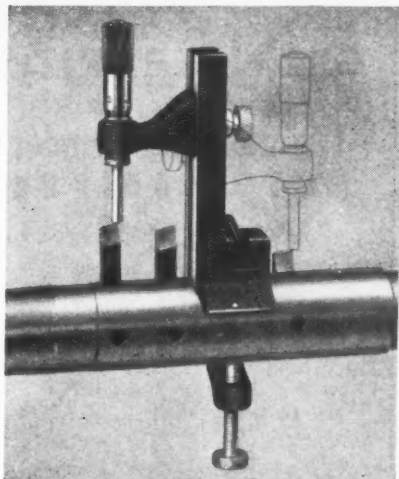
"Just a twist of the wrist"

Easily attached to standard surface grinder. Becomes part of machine. Absolutely true dressing regardless of relative position of wheel to work table, without disturbing set-up. All hardened, ground and lapped, except bracket.

Write for Bulletin 602K.

Made by Florian Mfg. Co., Plantsville, Conn.

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AMERICAN STANDARD CO.
SOUTHINGTON, CONNECTICUT



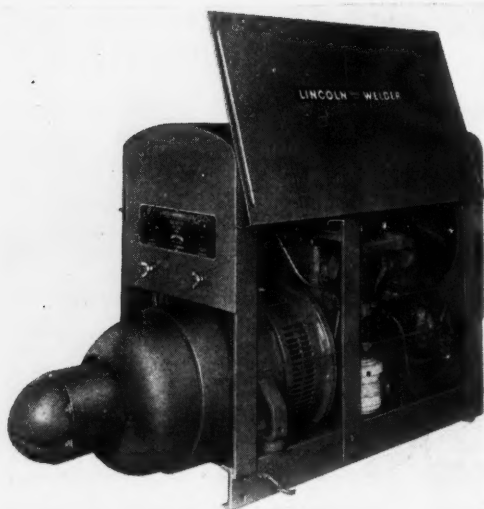
BARTELT ENGINEERING CO.

1216-G Partridge Avenue

BELOIT

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WISCONSIN



Lincoln 200-Ampere "Shield-Arc"
Engine-Driven Arc Welder

land 1, Ohio. Ruggedly constructed, the unit includes a powerful rubber-mounted engine of 20 h.p. and is supplied com-

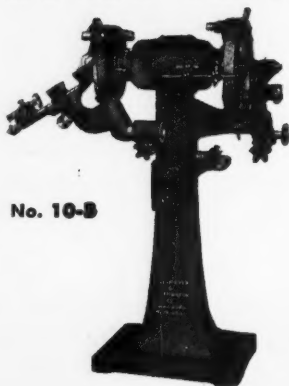
plete with base and canopy, as shown.

Designed for metallic arc welding with bare or coated electrodes, the welder, which has a current range of from 40 to 250 amperes, can also be used to supply uniform welding current for carbon arc welding operations. Dual control of welding current is accomplished by adjustment of series fields and generator speed.

According to the manufacturer, the generator control or "job selector" provided assures accuracy of open circuit voltage and allows for precise control of engine speed of from 1,500 to 1,150 r.p.m. for welding. In addition, this control may be used to manually reduce the engine speed to as low as 750 r.p.m. whenever it is necessary to stop welding at intervals of a few minutes, thus reducing fuel consumption and engine wear. The generator is arranged so

GRAND RAPIDS

Combination
Tap and Drill Grinder
MOTOR DRIVEN



No. 10-B

SHARPENS TAPS No. 6 to 1½"
2-3-4 Flute, Right or Left Hand.

SHARPENS DRILLS ⅛" to 1½"
2 or 3 Flute, Straight or Taper Shank.

Other Combinations also available.

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GALLMEYER & LIVINGSTON CO.
336 Straight Ave., S. W. • Grand Rapids 4, Mich.

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Welder

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Mich.

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Bench Mill Jobs are Easy with this Lewis Tool



Ample capacity and adjust-ability make the Lewis Bench Mill efficient and economical to use — whether it's on the production line, or in the job shop or tool room!

Available as semi-finished foundry castings with material and blueprints or as rough castings at still lower cost. All machining completed is done to a high degree of accuracy to insure precision operation. Machining in your own shop is rapid and simple, using only lathe

and drill press on semi-finished unit

Send for Lewis Catalog giving complete description of

Lewis
MACHINE TOOL CO. *Castings*

22 other useful, valuable shop tools.

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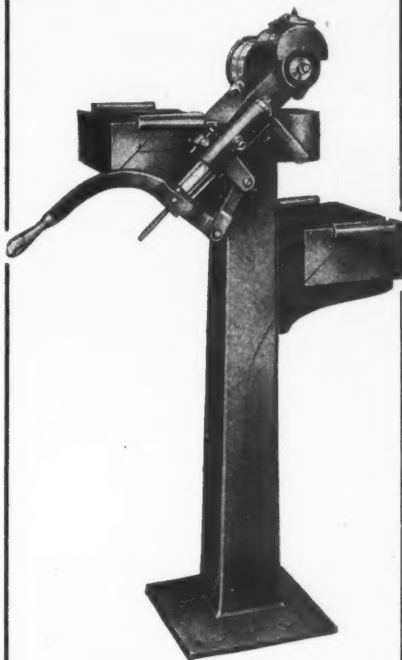
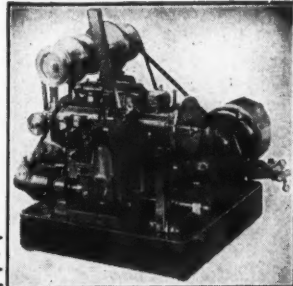
Sta. A, Dept. T-42, Los Angeles 31, Calif.

WALTHAM

Pinion and Gear Cutting Machines

with revolving cutter will make 2 or 3 successive cuts for watch pinions or may be used for fine pitch gears up to 1 1/2" dia. Revolving cutter makes successive cuts on blanks held and indexed by work spindle and usually supported by a tail center. Only straight teeth can be cut. Write for Bulletin No. 112.

WALTHAM MACHINE WORKS
WALTHAM MASS.



SCREW HEAD SLOTTER

1/8" to 1/2" Screw Body Diameter.
Will not injure screw threads.

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Easy to Operate
High Production
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ALSO MAKERS OF
ROTARY TABLES — MILLER VISES
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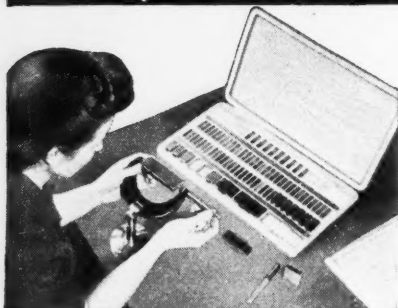
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JOHN B. STEVENS INC.
482 CANAL ST., NEW YORK 13, N. Y.

July, 1944

MODERN MACHINE SHOP 285

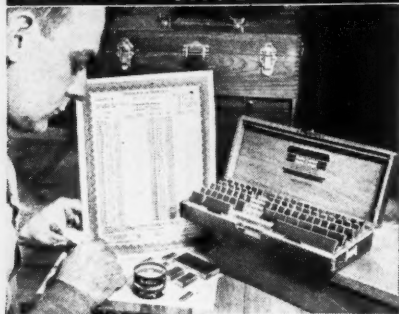
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Avoid delays and extra man hours required to replace orders of important products because of dimensional inaccuracies:

DoALL GAGE BLOCKS



The modern key to precision. To take care of every gage block need, DoAlls are furnished in three accuracies: **Laboratory Set**—2 millionths of an inch, **Inspection Set**—4 millionths of an inch, **Working Set**—8 millionths of an inch.

FREE — Handbook of Scientific Inspection.
Write for a copy of "QUALITY CONTROL."

CONTINENTAL MACHINES, INC.

1306 S. Washington Ave. Minneapolis, Minn.

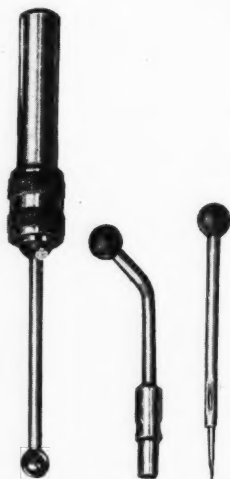
286 MODERN MACHINE SHOP

that it can produce its rated current of 200 amperes when the job selector is set for operating the machine at speeds as low as 1,000 revolutions per minute.

Weight of the unit as illustrated is approximately 1,130 lb. Overall length is 65½ inches; width, 24 inches, and height 41½ inches.

Nork Interchangeable Shaft Wiggler

Designed to enable tool and diemakers and machinists to make precision setups quickly and with extreme accuracy, the Nork Interchangeable Shaft Wiggler



Nork Interchangeable Shaft Wiggler

shown herewith is now being offered by Nork Products Co., 5897 S. Main St., Los Angeles 3, California.

The wiggler is supplied complete with three shafts which are held by a spring chuck that permits them to be interchanged without repeated adjustment. Proper spring tension is obtained by turning knurled collar with fingers before inserting ball of any attachment. Thereafter, shafts may be interchanged by snapping them into and out of chuck.

Ball shaft is used for indicating from ground or machined surfaces, from gage blocks, and from side of round bars. The hardened and ground ball is 0.250 inch in diameter. In use, the ball is first made to run true by holding blunt

July, 1944

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HARGRAVE Clamps



Stock sizes range from $\frac{1}{4}$ " to 16" deep. A complete line in all patterns and sizes.



THE CINCINNATI TOOL CO.

Est. 1879

1947 Waverly Ave., Cincinnati 12, Ohio

The **CINCINNATI TOOL CO.**

LUMA
Patented



Combination Demagnetizer and Electric Etching Pencil. Marks symbols in hardest steel. Demagnetizes instantly.

One of our models popular in tool rooms for 15 years.

Luma Electric Equipment Co.
DEPT. MS TOLEDO 1, OHIO

TIME SAVER FOR QUICK CHANGE MARKING

- Fastest and simplest way to number parts.
- Easy! Just turn screw to change numbers.
- Made of best quality tool steel.
- Guaranteed for years of service.
- **PROMPT DELIVERIES**

STOCK TYPE

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2.... BA 186429

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MODERN MACHINE SHOP 287

object against it while spindle is turning. The ball is then coated with layout blue and the work fed toward it until blue is barely wiped. Table is next lowered and moved 0.125 inch to bring reference surface directly under spindle center. Subsequently, by using micrometer collar on lead screw, any desired distance can be located within very close limits.

Bent shaft is designed to hold any type indicator, either in shank or in hole. It is used for locating from tool-maker's buttons or holes and allows ball of indicator to be positioned on any cir-

cle from center of spindle to diameter of 6 inches.

Needle-point shaft is used to find centers and true to layout lines in same manner as ordinary wiggler. The sharp, slender point is rigidly held in friction grip and is readily replaceable.

Fixture for Making Jominy End Quench Hardenability Tests

The American Iron and Steel Institute has determined on the Jominy end quench hardenability test as the best

DORMAN TAPPERS

FLOATING CHUCK JAW

Automatically Centers Tap



Easy adjustment from light friction to positive drive by intermediate stages.

Three sizes: No. 1 drives taps 2-56 to $\frac{3}{8}$ " in steel or any other material.

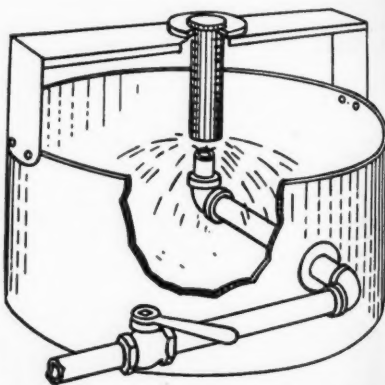
No. 2 positive taper drives from $\frac{3}{8}$ " to $\frac{3}{4}$ " tap in steel or any other metal.

No. 3 drives $\frac{1}{2}$ " to 1" in steel or any other material.

PROMPT DELIVERY ON ALL SIZES

Write for details

DORMAN MACHINE TOOL WORKS
 357 CANAL ST. • NEW YORK 13, N. Y.



Cutaway view showing fixture for making Jominy end quench hardenability tests. The test specimen is shown hanging in flange.

and quickest method of determining the response of NE steels to heat treatment. To meet the need for suitable equipment for making such tests, the Claud S. Gordon Co., 3000 S. Wallace St., Chi-

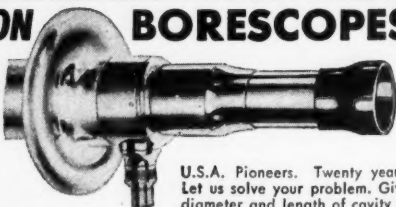
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**NEAT
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in
**NAME
PLATES**




Nameplate Detail Press

This machine quickly stamps details and serial numbers into name plates.

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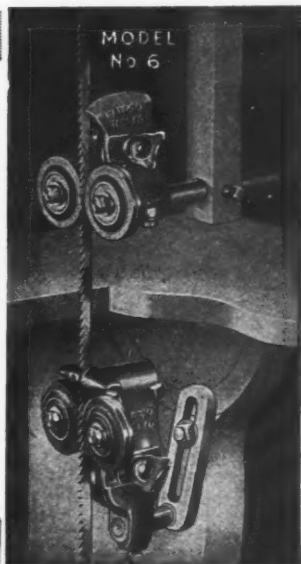
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July, 1944

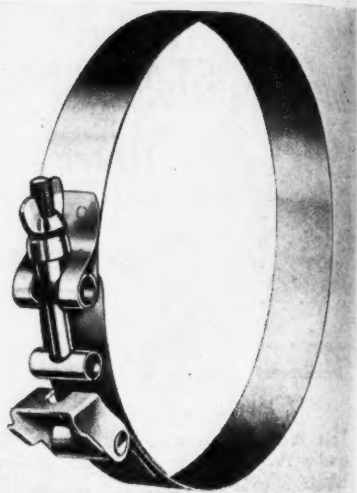
MODERN MACHINE SHOP 289

cago 16, Ill., has brought out the fixture shown in the accompanying illustration.

This fixture is said to provide means for making Jominy hardenability tests with maximum ease and speed. It is supplied complete with tongs for handling specimen to be tested.

Marman "Quick-Coupler" Clamp

Known as the "Quick-Coupler," a clamp combining a snap-on latch with the full adjustment of a standard clamp

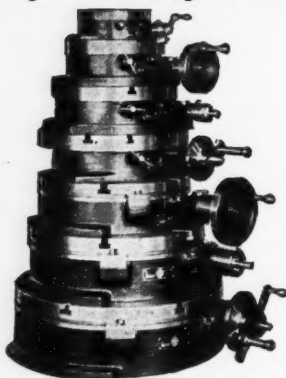


Marman "Quick-Coupler" Clamp

—a construction which allows for the instantaneous removal or quick installation of the clamp—is now being produced by the Marman Products Co., Inc., 940 W. Rendondo Blvd., Inglewood, Cal. The clamp is said to be ideally suited for use on oxygen containers, fire extinguishers, duct sections, and so on.

The Marman Quick-Coupler Clamp is available in aluminum alloy and stainless steel, in sizes and shapes to fit various convex surfaces. It may be obtained with self-locking, plain hex or wing nuts. According to the manufacturer, the design of the clamp permits the application of a uniform radial pressure to the periphery of the part over which the clamp is installed and its rugged construction allows for re-use.

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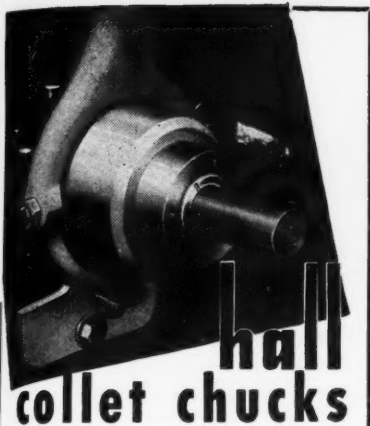
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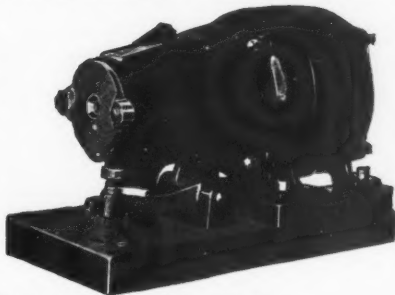
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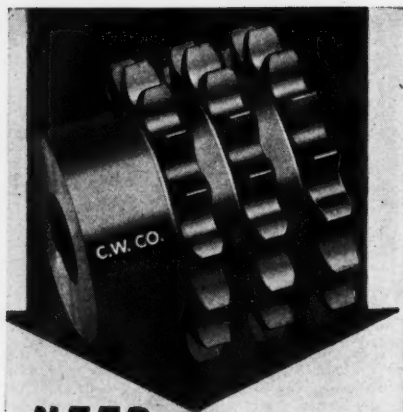


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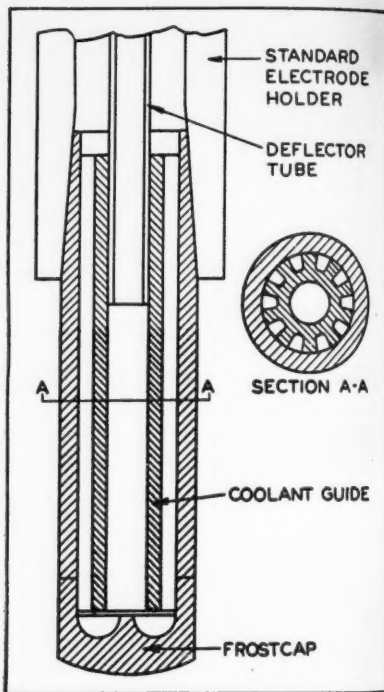
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Self-Adapting "Frostpoint" Spot-Welding Electrode

A self-adapting "Frostpoint" spot-welding electrode for use with standard electrode holders is announced by Frostrade Products, 19003 John R St., Detroit 3, Mich. Previously, adapters were required to separate the cooling refrigerant in the Frostpoint from the



Self-Adapting "Frostpoint" Spot-Welding Electrode

water circulation in the electrode holder for welding in the 0 deg. F. range. The self-adapting electrode, while retaining the controlled coolant flow, increased cooling surfaces, replaceable finned cap, and other features of the standard Frostpoint, is said to be applicable to spot-welding operations even above the zero range and to provide for complete interchangeability with conventional electrodes.

The self-adapting Frostpoint, though

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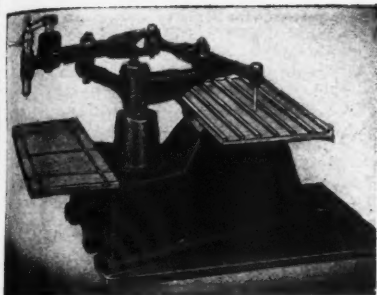
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Unskilled operators will profile or accurately reproduce in smooth lines any design, number, letter, emblem; on iron, brass, copper, aluminum, soft steels and all plastics. Here are some of its other uses . . . Drills a series of holes, or profiles small parts. • Cuts an even channel for wiring on panels. • Increases accuracy and production. • Works from original drawing or templates. • Etches glass and similar items. • Will not cause distortion. For information and prices write Dept. M.

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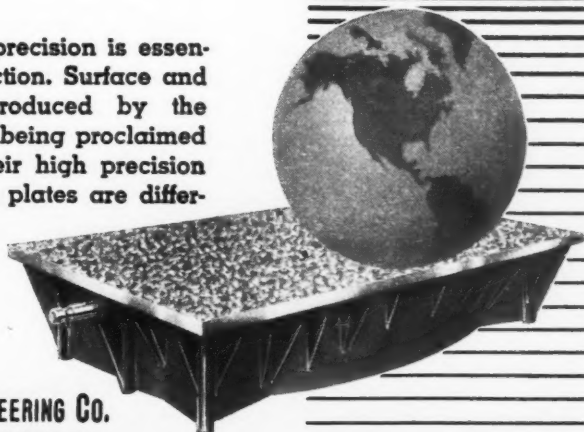
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July, 1944

MODERN MACHINE SHOP 293

intended primarily for use with refrigerated coolants, is claimed to provide efficient cooling effect with ordinary water circulation. The design of the electrode is said to make it particularly useful in welding adjacent to flanges, overhangs, in channels, and so on.

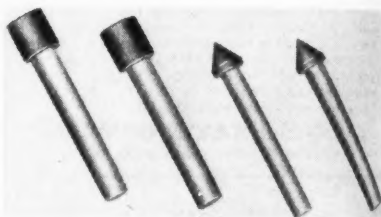
When the self-adapting Frostpoint is inserted in a standard electrode holder, the deflector tube is engaged by a full-length coolant guide, thus providing a metered flow of the coolant through the internally finned "Frostcap." The return flow is through a large number of parallel passages, allowing extensive

surfaces of metal to come in contact with the coolant, thus increasing heat dissipation.

The self-adapting Frostpoint electrode is available in outside diameters of $\frac{5}{8}$ and $\frac{7}{8}$ inch and in any standard length. Replaceable Frostcaps can be supplied in electrolytic copper for maximum thermal and electrical conductivity or Mallory 3 metal for maximum hardness.

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Champion Diamond Impregnated Burrs and Wheels

ing, precision surfacing, and unusually smooth final finishing operations is now being marketed by the Champion Diamond Co., 551 Fifth Ave., New York 17, New York.

The burrs and wheels are made of tungsten powder and diamond grit which are mixed together and formed, and are available in sizes from $\frac{1}{8}$ to 1 inch in diameter.

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14 $\frac{1}{2}$ " - 16 $\frac{1}{2}$ " - 18 $\frac{1}{2}$ " Swing

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1840 - 1944

The Bradford Machine Tool Co.

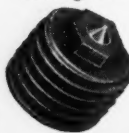
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It's a help that die makers, tool makers, machinery builders and general machinists have long sought—a more accurate and surprisingly faster way of transferring blind screw holes.



The Heimann Transfer Screw Set is a self-contained, complete tool. No wrenches or pliers are necessary. Made in $\frac{1}{4}$ " to 1" diameters. Send for price list.

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Capacity in lbs.	1,000	2,000	2,000	5,000	10,000

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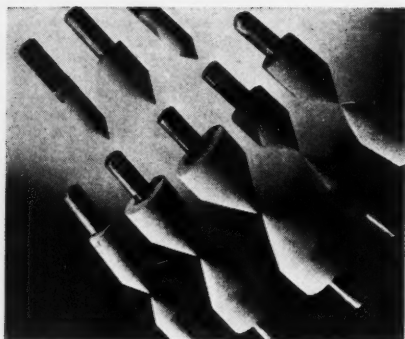
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For progressive medium-sized plant. Must be familiar with modern mass production methods and be capable of designing tools adapted for high production at low cost. Must have at least 5 years of tool designing experience, and be capable of checking and directing work of tool draftsmen or detailers. Man with some practical tool-making experience and desire to work with group of production-minded executives. A real opportunity for an alert tool engineer to progress with growing company of established reputation. WMC rules.

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Bay State "Blue Flash" Center Lapping Points

Bay State "Blue Flash" Center Lapping Point

To meet the extremely close tolerances demanded in thread grinding and "O.D." grinding operations, Bay State Abrasive Products Co., Westboro, Mass., has added a center lapping point to its "Blue Flash" line of mounted grinding

and polishing wheels and points.

Designed for use on Ex-Cell-O center lapping machines, the lapping point is manufactured in blank form and then shaped, trued, and sized after mounting on mandrel. According to the manufacturer, the finished product is a sharp, smooth-running lapping point having no hard or soft spots and which requires no dressing.

The grit of the Blue Flash Lapping Point is fitted to the grind. Different bonds and special treatments are available. The mandrel has a heavy, deep-cut knurl to provide maximum binding surface for the cement and thus prevent point from coming off the spindle.

The Blue Flash Center Lapping Point is supplied mounted on 1/2-inch mandrel and is available in all regularly required sizes and specifications.

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A line of heavy duty two-stage stationary compressors for industrial plants, mines, and heavy contracting is now being offered by the Sullivan Ma-

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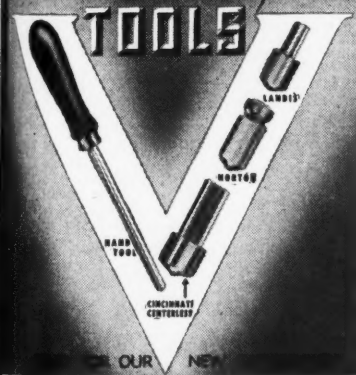


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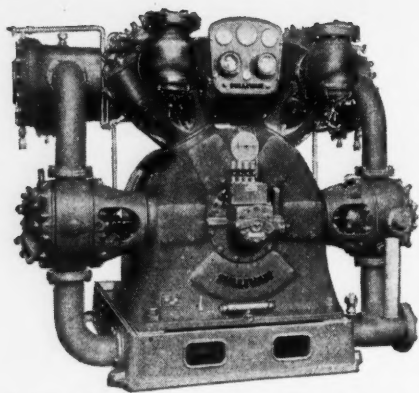
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INDUSTRIAL DIAMONDS AND DIAMOND PRODUCTS

351 FIFTH AVE., NEW YORK 17, N. Y.



Sullivan Heavy Duty Stationary Compressor

chinery Co., Michigan City, Indiana.

The line includes a two-cylinder V-vertical type compressor, designated as the WN-112, which is available in five sizes of from 378 to 914 c.f.m.; four-cylinder semi-radial type, designated as the Class WN-114, which is available in five sizes from 1,092 to 1,828 c.f.m.;

Twin WN-112 in four sizes from 960 to 1,828 c.f.m., and Twin WN-114 in four sizes from 2,184 to 3,656 cubic feet per minute.

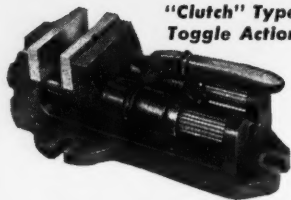
Twin units have common double-shaft motors. One compressor with motor can be installed and a twin compressor added when required.

Wheelco Chronotrol

An instrument which is designed to enforce any desired heating or cooling program, to be known as the Chronotrol, is announced by Wheelco Instruments Co., Harrison and Peoria Sts., Chicago 7, Ill. The instrument employs an electronic principle of effecting temperature control, and is said to provide completely automatic temperature regulation regardless of the changes in temperature desired for a given process or application. The temperature cycle desired is cut on a disc which is rotated by a synchronous motor, thereby moving the temperature setting lever of the instrument.

The Wheelco Chronotrol is offered in 25 models, including ten for proportioning control and others for two-positions

How to Speed Up Milling and Drilling

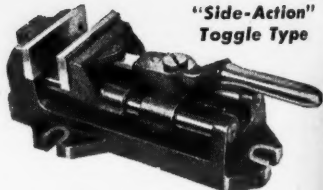


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For clamping parts of
varying thickness.

Three
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3", 5"
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Jaws



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For clamping parts of
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It's not difficult to understand why the Presto-Vise speeds up milling and drilling operations. Its wide opening and fast-moving jaws make it easy to get work in and out of vise quickly. Less time is also required because of its quick-acting method of exerting pressure by toggle-action. And the jaw pressure, once set to whatever amount is necessary, remains set for the duration of any particular job. Send for circular and engineering data.

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up **PRODUCTION**

"THE TOOLMAKERS BEST FRIEND"

Production on the operation illustrated jumped 1000% from three pieces in ten minutes to three pieces in one minute by eliminating a milling operation and using a Grob Filing Machine and the nimble fingers of the young lady. We are anxious to help you solve similar problems. Please write and let us serve you.

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For speed and quality in grinding flat surfaces of metal, wood, hard rubber, celluloid and plastics. Can be furnished in both vertical and horizontal type—9", 14", 20" sizes.

Other Horizontal and Vertical types for flat or round work can be furnished.

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REID BROTHERS CO.
NEWTON, MASS.
U.S.A.

on-off and three-position on-intermediate-off control for high and low-temperature applications. Thermometer models are available in recording as well as indicating types.

According to the manufacturer, the absence of mechanical linkage between the measuring and control sections of the Chronotrol makes possible instant response of the instrument's control unit to changes in temperature noted by its sensing unit. The frequency of oscillating current flowing between pickup coils, mounted on the temperature control setting index, is changed when a control

flag mounted on the pointer or pen arm is moved between the coils by a temperature rise, or is moved from between the coils by a temperature drop. This

JOHNSON'S

Adjustable Limit SNAP GAGES



MODEL A



MODEL B



MODEL C

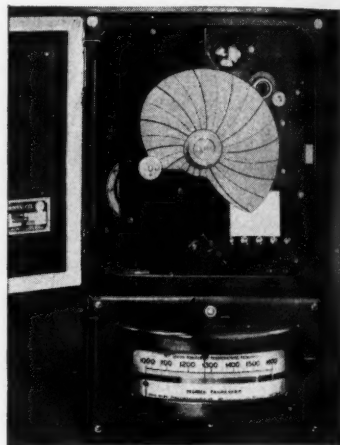
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Pequannock, N. J.



Wheelco Chronotrol

frequency change in the control circuit governs the output current of a vacuum tube, acting to open relay contacts which, in turn, operate fuel valves or switches.

Boyar-Schultz Model H Screw Machine Adapter

Said to double the capacity of the particular screw machine in which it is installed, the Boyar-Schultz Model H Screw Machine Adapter featured in the



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VARIOUS WIDTHS
and GAUGES



BUTTS AND
CONTINUOUS LENGTHS

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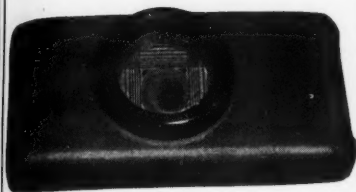
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4533 W. LAKE STREET HARDWARE DIVISION CHICAGO, 24, ILLINOIS

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CASES
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by a tem-
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drop. This

"ALL-WAY" LEVEL



The FELL Precision Level is made to show the level of all ways at once. This eliminates disturbing the first level when leveling the second. Graduations are in .0005" per foot and form squares about a circular bubble, thus giving co-ordinate readings and showing direction and amount of slope, if any.

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16 Ga. with Drop Handles
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Four sizes. All Welded.
Olive Green enamel.

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Steel and wood with or
without drawers.

Literature on request.

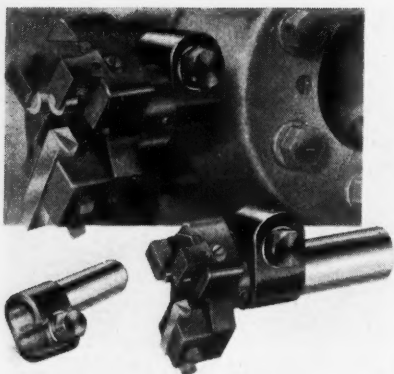
STERLING
FACTORY EQUIPMENT CO.

183 CHARLES ST.
PROVIDENCE, R. I.

NOIS

July, 1944

MODERN MACHINE SHOP 301



Boyar-Schultz Model H Screw Machine Adapter

accompanying illustration is now being introduced by the Boyar-Schultz Corp., 2120 Walnut St., Chicago 12, Ill.

Designed to permit the use of more than one size tool on a single size screw machine, the adapter is precision made throughout of high grade tool steel and is hardened and ground to assure correct fit. The unit is available in sizes

$\frac{5}{8}$ to $\frac{3}{4}$ inch short, $\frac{5}{8}$ to $\frac{3}{4}$ inch long
 $\frac{5}{8}$ to 1 inch, and $\frac{3}{4}$ to 1 inch.

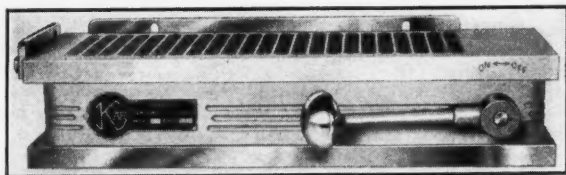
Styles P and Q Stellite-Tipped Tools

Designated as the Styles P and Q two Stellite-tipped tools especially designed for machining steel are announced by the Haynes Stellite Co., Kokomo, Ind. Each tool comprises a cutting tip of Stellite 98M2 cobalt-base alloy brazed or butt-welded to a tough steel shank, with proper clearance and lead angles ground for machining steel. In addition to use in turning, boring and facing operations, these tools can also be used for various types of forming and grooving operations.

The Style P is a right-hand tool; the Style Q is a left-hand tool. Each tool is ground with a 15-deg. end cutting edge angle, 15-deg. side cutting-edge angle, 7-deg. end relief angle, and 7-deg. side relief angle. The tools are furnished with flat tops so that users can grind side rake angles to suit particular jobs.

The Styles P and Q tools are each

KAR Permanent Magnet CHUCKS



Cannot Fail
Hold Work Tight
Generate No Heat

An outstanding and exclusive advantage of the KAR Permanent Magnet Chuck is its ability to hold smaller pieces securely due to the close spacing of the pole pieces.

Release Easily
Used Wet or Dry
Use No Power



THE KAR ENGINEERING CO., Inc.
GREAT BARRINGTON MASSACHUSETTS

**TO HELP
YOU TEACH
THE NEW
GRINDER
HAND**



how to get maximum service from your Diamond Tools—we have some effective training material. Send for it. No obligation.

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**KOEBELITE
DIAMOND TOOLS**

Multi-Point, Multi-Set, Multi-Edge, and Single Set. Diamonds for All Industrial Purposes.

**Micra
Supreme
IMPROVED
LAY-OUT-DYE**



FOR TOOL, DIE,
PATTERN OR TEMPLATE
LAY-OUT ON METAL

LOW IN PRICE

**MICHIGAN CHROME &
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The
WIGGLER
has had its
day!



There was a time when the wiggler was considered "tops" for positioning a machine tool spindle. BUT, THAT'S NOT TRUE ANY MORE.

The Center Scope is now the fastest method for accurate centering of a machine tool spindle. It has a trimming screw to compensate for spindle run-out, which European-made microscopes do not have. 45X magnification makes it easy to work to tenths.

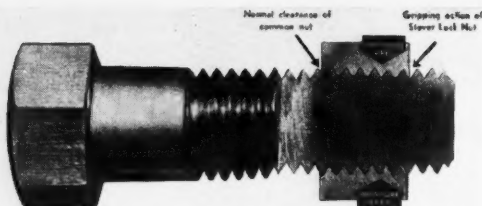
As a top-flight mechanic, you should own a Center Scope—or, if you feel that the boss should buy one, put the bee on him.

Center Scope with Illuminator
and Eye Shield.....\$97.00
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Edge Block for use with Center
Scope\$23.00

For complete details, write Dept. CS (1)

Kearney & Trecker Products Corporation
MILWAUKEE 14, WISCONSIN



Stover Self-Locking Nut

available in five sizes as follows: $\frac{5}{8}$ x $1\frac{1}{4}$ x 8 inches; $\frac{3}{4}$ x $1\frac{1}{2}$ x 9 inches; 1 x 1 x 7 inches; 1 x $1\frac{1}{4}$ x 7 inches; and $1\frac{1}{4}$ x $1\frac{1}{4}$ x 7 inches. The tools can also be made with Stellite Star J-Metal tips if desired.

Stover Self-Locking Nut

Designed to retain its grip despite rigorous vibration, a self-locking nut which is said to meet Army and Navy specifications for many types of war materiel, including planes, tanks, motor vehicles, guns, and ships of various sizes, is now

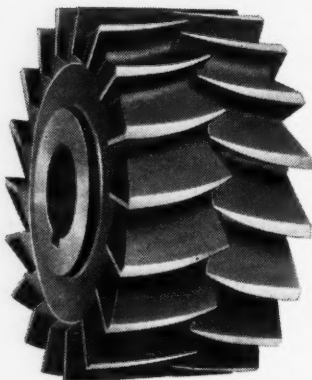
being marketed by the Stover Lock Nut & Machinery Corp., Easton, Pa. The nut is available in 14 bolt sizes from $\frac{1}{4}$ to $1\frac{1}{2}$ inches, with National Coarse or National Fine threads.

Manufactured in accordance with a new but simple principle, the Stover Self-Locking Nut acts as a powerful spring which clutches the bolt firmly and will not shake off, it is claimed. This result, the manufacturer states, is achieved by subjecting what appears to be an ordinary nut

to the Stover compressing process whereby the upper part of the threaded portion is made slightly elliptical while the lower threaded portion remains circular. The nut is precision faced and made so that any regular wrench will fit it. Once the threads are entirely on the bolt, the nut locks itself by utilizing the natural elasticity of the metal.

Of one-piece design, the Stover Self-Locking Nut can be made to any torque required and of any material. According to the manufacturer, the nut locks at any desired point on the bolt, does not harm bolt threads, and can be used over and over again without loss of efficiency.

Aber CURVED TOOTH Milling Cutters with "Chatterless Flowing Action"



Patented

- HIGHER SPEED (R.P.M.)
- LONGER CUTTING SURFACE
- LONGER LIFE

Types:

Plain Milling, Staggered Tooth Side Milling, RH or LH Half Side Milling, Overlapping Side Milling, Right and Left Hand Shear Side Milling and Woodruff Keyway Cutters. Cutters up to 14" Diameter.

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They will outwear ten tool steel or
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CATALOG 5-44.

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In Accordance to A.G.D.

Single End—Double End Plugs
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(Catalogues Not Available)

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10" dia.

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end, each tooth is
larger in pitch and
height. The result is
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cutting. Order through your
Mill Supply House or write for
complete information and details.



It's a Super-Sterling saw

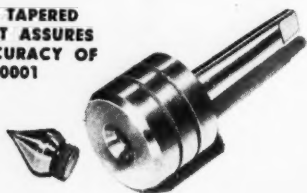
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WITH REPLACEABLE POINT

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A. Very large, for pipe or tubing work



B. Extra long point used in facing operations

C. Extra wide point for large diameter work

D. Standard point

E. Blank made of soft tool steel for nests

F. Female for work not having centers

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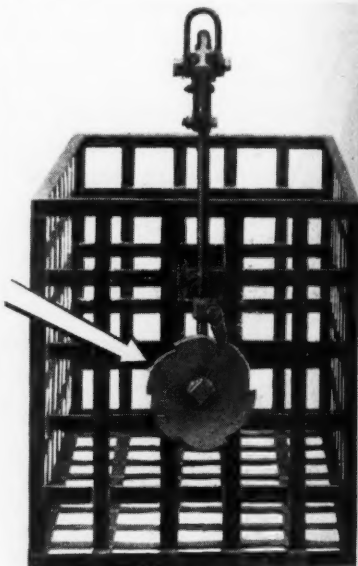


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Lubricants or changing temperatures are said to have no effect on the holding power of the nut.

Simplified Ratchet for Weldco Pickling Baskets

Especially designed for application to Weldco baskets used in pickling pots, pans, vessels, and many types of metal



Weldco Pickling Basket Equipped with Simplified Ratchet

parts, a simplified ratchet which, when properly installed, permits baskets to be tipped to six different positions for draining pickling acids easily and quickly has been developed by The Youngstown Welding & Engineering Co., Youngstown, Ohio. The ratchet is said to be positive and strong enough for application to practically any size pickling basket.

The accompanying illustration shows the ratchet installed on a Weldco crate 60 inches long by 32 inches wide by 3 inches deep and weighing 304 lbs. The basket has a capacity for 3,000-lb. load

ALLIGATOR



TRADE MARK

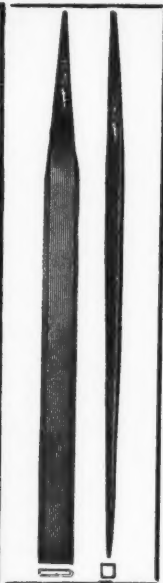
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STANDARD SIZES OR SPECIAL DESIGN to your specifications; send sketch or worn sample, regardless of condition, for quotation, without obligation. • Our complete catalog will help you in making selection of bearings—shall we send it?

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Fluid-Motion for Modern form-dressing

ONE SETTING
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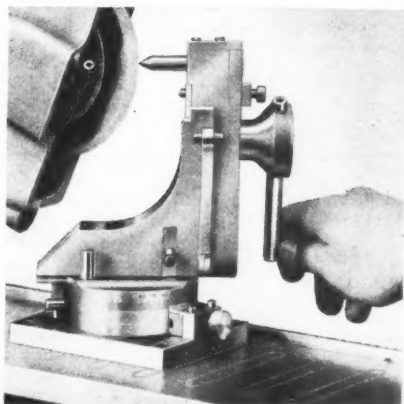
The J & S Model "E" Radii and Angle Dresser in the new "Fluid-motion" series is one of the finest precision dressing instruments procurable—regardless of cost.

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.0001" accuracy
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Large range yet compact
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J. & S. TOOL CO.

477 MAIN ST. E. ORANGE 5, N. J.





Anderson Model HP-0167-P Power Press with Traveling Arm

Especially adaptable for straightening cam shafts, a power press with traveling arm, to be known as the Model HP-0167-P, has been introduced by the Anderson Bros. Mfg. Co., 1926 Kishwaukee St., Rockford, Ill.

Designed to eliminate the need for moving anvils, centers, and work, the ram travels on ball bearings and is provided with sensitive control to allow for precision straightening of shafts. The base and hydraulic unit of the machine are the same as used on the Anderson Model HP-010-P.

The Model HP-0167-P power press

Anderson Model HJ-0167-P Power Press with Traveling Arm

with traveling arm has a capacity of 10 tons, however, a similar press with 25-ton capacity is now in the process of being made available.

Carlin Grades P-61, P-103, P-170 and P-180 "Perfection" Welding Electrodes

The Anthony Carlin Co., 2717 E. 75th St., Cleveland, Ohio, announces the addition of four electrodes, designated as the Grades P-61, P-103, P-170, and P-180, to its line of "Perfection" welding electrodes.

The Grade P-61 is a shielded arc, general purpose, straight polarity d. c. electrode for welding mild steel in all positions. It is especially designed for fast application where high currents are used and the arc action is strong, and is said to meet the requirements of A. W. S. Classification E6012.

The Grade P-103 is a shielded a. c. electrode suitable for all-position welding and meeting the requirements of A. W. S. Classification E6011 and A. S. M. E. Par. U-68. It is also suitable for welding the low-alloy high-strength steels when these steels are used primarily for their high-strength properties.

The Grades P-170 and P-180 are bare and wash-coated electrodes, meeting the requirements of A. W. S. Classification E4510 and E4511, respectively. These

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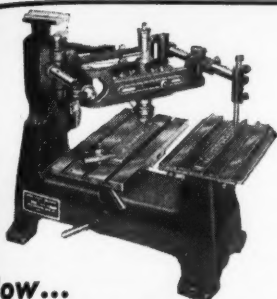
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July, 194



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KEYSEATER**

**will do the
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quicker
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DAVIS KEYSEATER CO.

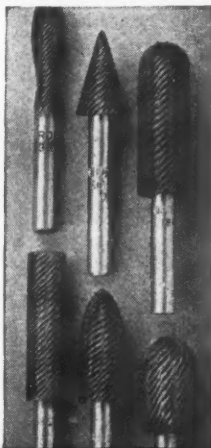
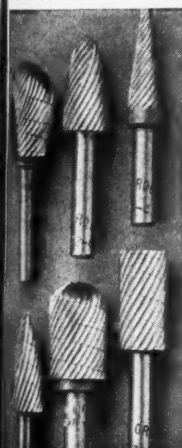
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**HAND CUT • MILLED CUT
GROUND FROM THE SOLID**

There is a GROBET ROTARY FILE in
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every type of hard or soft metal, plas-
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IMPORTERS OF GROBET SWISS FILES

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MODERN MACHINE SHOP 309

July, 1944

straight polarity d. c. electrodes are said to have wide application where the physical properties indicated in the specifications are acceptable.

Matthews "Sure-Set" Type Holder

A holder which is designed to accommodate both etching type and logotypes for use in the straight-line marking of parts, to be known as the "Sure-Set," has been placed on the market by Jas. H. Matthews & Co., 3944 Forbes St., Pittsburgh 13, Pennsylvania.

The holder, which can be used with any desired character down to 3/64 inch in size, is made of an ebony black acid-resisting long-wearing plastic, including adjuster for loosening or tightening type in place. The slotted construction at the face of the holder is said to allow for insertion of rubber or synthetic type without binding or distortion. The taper design of the holder at the face affords clear view of type—a feature which is claimed to be extremely helpful when marking in limited areas. Construction is said to be such that type cannot fall out of ends of holder.

Comfortable to handle due to rounded and tapered contour, the Matthews



Matthews "Sure-Set" Type Holder

"Sure-Set" Type Holder is available in three sizes. The No. 1 size is designed for characters from 3/64 to 1/8 inch inclusive. Standard marking widths are 1/2, 1, 1 1/2, 2, and 2 1/2 inches. Special widths can be furnished to any desired dimensions. All type for No. 1 holder, regardless of character size, is made on 12 point body size.

The No. 2 size Sure-Set Holder is recommended for characters from 5/32 to 5/16 inclusive. Width specifications are the same as those for No. 1 size holder.

Adjustable Limit Snap Gage Specialists For 28 Years Exclusive Features



1. Patented locking device, adjusting and locking means completely housed within the head.
2. Square shanks on pins and anvils to prevent turning in the holes.
3. Light weight but very strong frame to give user a better sense of feel on his work.

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107 N. Franklin Street

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Manufactured by
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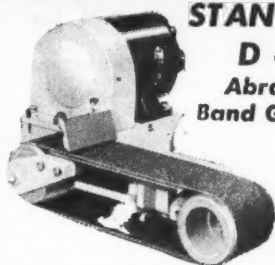
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STANDARD

D - 4

**Abrasive
Band Grinder**



This new, streamlined bench type grinder assures fast, quality finishing on metals, plastics, wood, fibre . . . at low cost. Built to machine tool specifications, Standard D-4 is equipped with improved band tension control and specially designed protective motor hood. 4x36 $\frac{1}{4}$ " band. The ideal portable unit.

OTHER STYLES AND SIZES IN NEW
BOOKLET ON FINISHING—WRITE TODAY

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96 Warren St., New York, N. Y.

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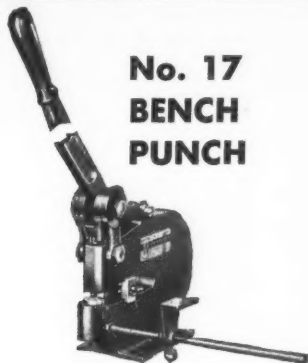
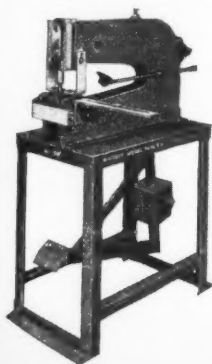
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FOUR SIZES

Powerful linkage multiplies foot power to provide fast, easy action on punching and forming operations. Four sizes are 7", 10", 18", 24" throat depths. Capacity 2" hole in 16 ga. iron.



No. 17 BENCH PUNCH

Capacity $\frac{1}{4}$ " hole through $\frac{1}{4}$ " mild steel. Throat depths 6 $\frac{1}{2}$ ". Throat height 1 $\frac{1}{8}$ ". Stock punches and dies available from $\frac{1}{8}$ " to 9/16" by 1/32". Weight 38 lbs.

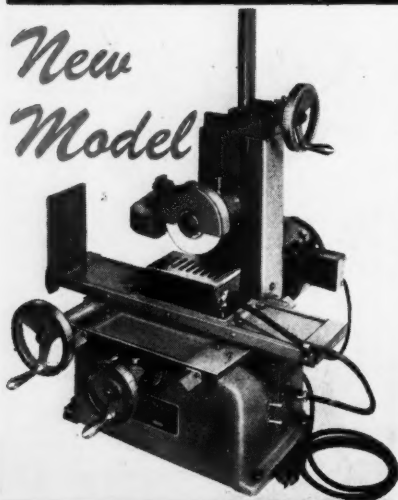
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WHITNEY METAL TOOL COMPANY

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**HIGH SPEED
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New Features

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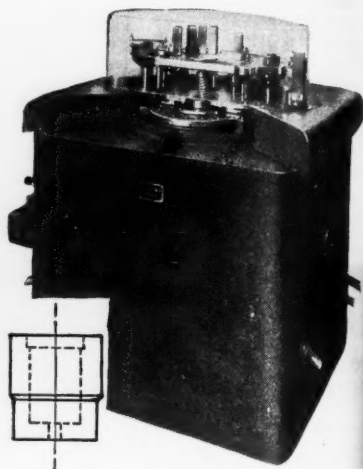
SANFORD MFG. CO.
1279-81 SPRINGFIELD AVE.
IRVINGTON 11, NEW JERSEY

All type for No. 2 holder is made on 24 point body size.

The No. 3 size holder can be used for characters from $\frac{3}{8}$ to $\frac{1}{2}$ inch inclusive. Width specifications are the same as those for the No. 1 size holder. All type for the No. 3 holder is made on 41 point body size. Overall length of all holder sizes is approximately 3 inches.

Interlakes "Check-Matic"

A machine for automatically checking dimensions of parts, to be known as the "Check-Matic," has been placed on the market by the Interlakes Engineering



Interlakes "Check-Matic"

Co., 502 Transportation Bldg., Detroit 26, Mich. The machine is said to provide automatic inspection of parts up to $1\frac{1}{2}$ inches in diameter and 2 inches in height, checking "go" and "no-go" on such dimensions as outside and inside diameters, depth of counterbore, wall thickness, and depth of holes, all to limits of 0.001 inch.

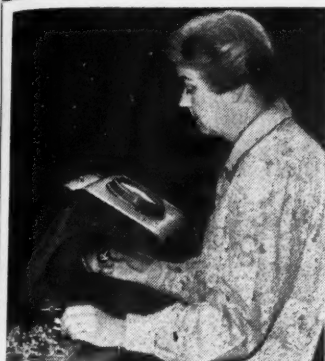
Parts to be inspected are simply placed in the holes of a revolving dial which carries them to the various gages for the series of inspection operations. If a part, as it progresses from one gage to another, does not meet any particular inspection test, it is automatically rejected through a tube which deposits

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Give your Inspectors, Toolmakers and Machinists better eyes for better work . . . with the

PORTABLE INSPECTO-GRAPH

Can be used anywhere by merely plugging into nearest 110 volt A.C. outlet. Two fluorescent tubes concentrate shadowless, diffused light on object to be inspected. Large four-inch lens magnifies work without distortion. Saves workmen's eyes and quickly detects defective parts. **Price \$35.00**

Write for descriptive literature.

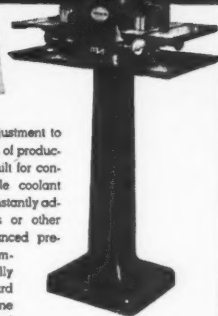
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105 Sanford St.

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The CRITERION Carbide Tool Grinder

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Provides positive rapid adjustment to meet the rigid requirements of production tool manufacturing. Built for continuous service. Adjustable coolant system. Large work tables instantly adjustable without wrenches or other tools. One-third HP balanced precision bearing motor completely enclosed and radially mounted in rubber. Standard equipment: One 60 and one 100 grit 7" dia. steel backed silicon carbide wheels. Ideal for metal bonded or Resinoid bonded diamond wheels.

Order from your dealer or write direct. Request literature. No obligation.

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**You Wouldn't Use a
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To Press Your Suit!**

Why use large expensive equipment involving costly set-ups for jobs which can be done more quickly with simple low-priced tools? Capacity of Builders' T' Surface Grinder—full 10" under 7" wheel, handles all work which should be surfaced on hand-operated machine. Though low in cost the "T" Grinder is precision built for grinding dies, gages, tools and small parts in job or production lots.

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Prompt delivery.
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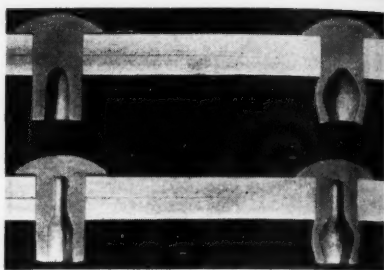
MODERN MACHINE SHOP 313

the part in a receptacle placed at the outlet of the tube. Since each gage has its own individual rejection tube, the rejected parts are segregated according to the particular inspection which they fail to pass. The Check-Matic is equipped with an 18-hole dial and is designed to check as many as 13 individual dimensions.

By eliminating the human element, the Check-Matic is said to provide for accurate inspection of parts on an unusually high speed basis. According to the manufacturer, parts like that shown in the accompanying illustration can be given a seven-dimensional inspection, including concentricity check, at the rate of 55 pieces per minute with the machine. A plastic hood covers the gages and delicate operating parts, protecting them from dust and moisture not only when the machine is idle but also when it is in operation.

Du Pont Improved Explosive Rivet

To provide for greater speed and uniformity of results in riveting military planes, an improved explosive rivet that is designed to fit itself to the hole has



(Above) Old style explosive rivet before and after being expanded. (Below) Improved explosive rivet before and after being expanded

been developed by the Explosives Department of E. I. du Pont de Nemours & Co., Wilmington 98, Del. The rivet is expanded from within along substantially its entire shank by a tiny explosive charge—a marked improvement over the original explosive rivet produced by DuPont which was expanded at the end of the shank to lock it in place.

Improvement of the rivet, which is made of aluminum alloy, was accom-



TYPE B—STRAIGHT JAW DESIGN

Adapted for work with short and long bores.

Size No.	Range of Bores Taken	Net Price
1X	$\frac{1}{8}$ " to $\frac{3}{16}$ "	\$10.00
2X	$\frac{3}{16}$ " to $2\frac{1}{32}$ "	11.00
3X	$2\frac{1}{32}$ " to $\frac{3}{4}$ "	12.00
00	$\frac{3}{4}$ " to $\frac{7}{8}$ "	14.00
0	$\frac{7}{8}$ " to 1"	16.00
1	1" to $1\frac{1}{8}$ "	18.00
2	$1\frac{1}{8}$ " to $1\frac{3}{8}$ "	21.00
3	$1\frac{3}{8}$ " to 2"	29.00
4	2" to $2\frac{1}{2}$ "	40.00

TYPE A—STEP JAW DESIGN

Especially adapted for holding work with short bores while being machined between centers on lathes, grinders, millers, shapers, etc.

Size No.	Range of Bores Taken	Net Price
1A	$\frac{1}{2}$ " to 1"	\$12.00
2A	1" to $1\frac{1}{2}$ "	16.00
3A	$1\frac{1}{2}$ " to 2"	23.00
4A	2" to 3"	34.00
5A	3" to 4"	40.00

W. H. NICHOLSON & CO., 136 Oregon St., Wilkes-Barre, Pa.

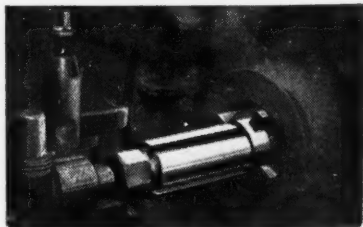
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The Standard in

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the world around



Other sizes taking up to 7" bores. Hardened tool steel, accurately ground. Sold singly or in sets. Prompt delivery. Bulletin No 1043.

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High Speed
Back Spot Facers
Core Drills
Flue Sheet Cutters**

*Interchangeable
and Solids
Also Specials*

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GREENFIELD • MASSACHUSETTS

**HURON ALL
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GAGE HANDLES**

TAPER-LOCK and TRI-LOCK

**ALL 10 STANDARD
SIZES**



*The
Best Costs You
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**ALMOND
DRILL CHUCKS**

Almond Three Jaw Drill Chucks have demonstrated their quality over a period of more than 70 years. They were pioneers in the field of Drill Chucks!

Whenever there is need for dependable chucks for holding drills, taps, reamers and other tools, chances are, you will find an Almond on the job.

Furnished in 9 sizes with capacities from 3/16" to 1"—made in heavy and light duty types with a taper arbor hole or with a threaded arbor hole. For Portable Drills.



SINCE 1872

WRITE FOR COMPLETE DETAILS.

T. R. ALMOND MFG. CO.

ASHBURNHAM

MASSACHUSETTS

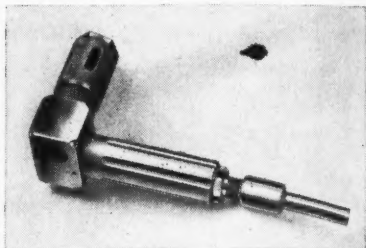
plished by embodying in it a small auxiliary explosive cavity and modifying slightly the explosive charge. The auxiliary cavity extends from the main chamber in the shank toward the head of the rivet. Detonation of the charge expands virtually the entire shank; thus, an exact fit between the drilled hole and the shank is said to be no longer required. This leeway is claimed to allow for more rapid insertion of rivets which may be expanded by one man at a rate of 10 to 20 per minute.

The DuPont Improved Explosive Rivet is available in diameters of 5/32 and 3/16 inch in modified brazier types. The explosive charge is usually detonated with an electric riveting iron which fires the charge in the cavity when heat is applied to the head. The improved rivet is said to have the same high resistance to corrosion as the original type and to be easily installed with the same tools. In addition, the new explosive used is claimed to have the same non-corrosive, nontoxic, and high-stability properties as the explosive in the original type.

Shown here is an old style explosive rivet before and after being expanded, and an improved explosive rivet before and after being expanded.

Invincible Improved Angle Tool Attachments

Improvements in the design of its angle tool attachments for use with portable drills as driving equipment and

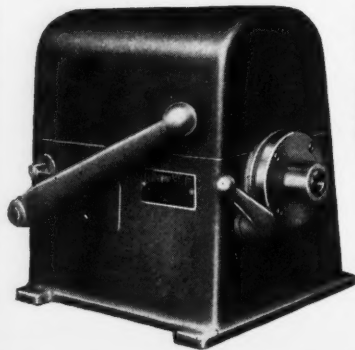


Invincible Improved Angle Tool Attachment

drilling hard-to-get-at areas are announced by the Invincible Tool Co., 6111 Empire Bldg., Pittsburgh 22, Pa. To provide added ability to withstand rough usage, the attachments are now equipped with steel screw feed plugs instead of bronze plugs. The screw feed

The COLBORNE Speed Lathes

**SPEED UP FINAL OPERATIONS ON
DIES • GEARS • SCREWS • LONG RODS**



A recent addition to the COLBORNE line of Speed Lathes is the Series 30 machine. This speed lathe is indispensable for economical polishing, grinding, burring and lapping.

Very compactly constructed to do highest quality work with the COLBORNE features of spindle bearings running in oil, instant stopping brake, easy opening collet and standard speeds of 600-920-1720-3280-4800 RPM using 3/4 H.P. motor and cone pulleys. Collets and chuck may be used.

For more production per day choose COLBORNE.

PROMPT DELIVERIES

Write for Details Today.

**COLBORNE MFG.
COMPANY**

Builders Since 1879
157 DIVISION ST. CHICAGO, ILL.



Tool

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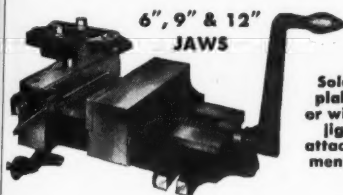
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1944

**FOR REPEAT OPERATION
OR ONE-TIME JOBS**



**6", 9" & 12"
JAWS**

**Sold
plain
or with
jig
attach-
ments**

GRAHAM MULTI-PURPOSE VISE

For straight holding or as a widely adaptable jig or fixture for innumerable special holding jobs, this Vise leads a busy life on miller, drill press, planer, radial, shaper, grinder, etc.

Request Illustrated Price Circular.

GRAHAM MFG. CO.

35 BRIDGE ST.

EAST GREENWICH, R. I.

PRECISION GEARS



**AS SMALL AS
5/16"
ARE BEING
PRODUCED BY
DETROIT
BEVEL GEAR**



**Gears of all types
are manufactured ex-
actly to your specifica-
tions in sizes up to 16".**

Supplied in any desired Material

DETROIT BEVEL GEAR COMPANY

8130 JOS. CAMPAU AVE.
DETROIT, MICH.

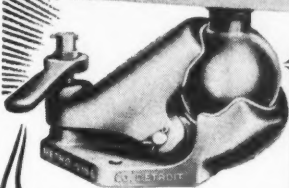
Makers of Quality Gears for 30 Years

NEW METRO-VISE POSITIONER

(TWO TOOLS IN ONE)

FACE PLATE

QUICKLY TILTED TO ANY ANGLE



BABBITT JAWS

**SMOOTH
OPERATING,
BALL AND
SOCKET
PRINCIPLE**

CLAMPING LEVER

RELEASES, OR LOCKS PLATE IN POSITION

**for MOUNTING
YOUR VISE, FIXTURE
or used as
ANGLE PLATE**

Holds or mounts work rigidly, for checking, milling, drilling, shaping, grinding, boring, welding and pattern making.

Quick, accurate adjustment to any desired angle, set with protractor. Easy to use. Three standard sizes.

Send for literature and prices.

METRO-VISE CO.

274 STEPHENSON BLDG.
DETROIT 2, MICHIGAN

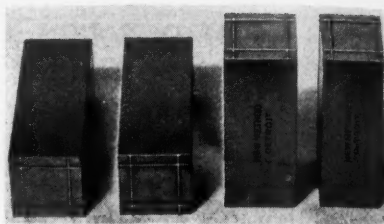
MODERN MACHINE SHOP 317

caps have hexagon ends for feeding with a wrench. In addition, the centers are now made of hardened drill rod, and a double thrust bearing on the lower gear takes the thrust both forward and reverse, with take-up for wear provided.

Invincible Improved Angle Tool Attachments are available with right- and left-hand spiral gears for drilling right and left-hand corners. However, the type of driving unit employed—whether reversible motor or single direction motor—must be specified since right and left hand tools must be used with right-hand drive air or electric motor. With a right and left-hand drive motor, gears having right-hand spiral teeth are used for either right or left-hand corner work.

New Method Steel Calibrating Dies

The marking of calibrating lines with extremely close tolerances can now be accomplished through the use of steel dies produced by New Method Steel Stamps, Inc., 149 Jos. Campau St., Detroit 7, Mich. The dies are made by precision pantograph milling. The four lines forming the central square in the



New Method Steel Calibrating Dies

end of each die are said to be held to a tolerance of 0.002 inch measured from the exact center of each line, thus insuring a square of extreme accuracy.

N. M. Engraved Knockout Pads

Knockout pads which can be engraved with any desired figures and numbers for marking deep drawn steel and other parts during the actual drawing process are now being produced by New Method Steel Stamps, Inc., 149 Jos. Campau St., Detroit 7, Mich. As shown in the accompanying illustration, the necessary fig-

**SMALL & COMPACT—IT DOES A GRAND JOB IN THE BIGGEST PLANTS
KEEPS SMALL DRILLS SHARP WITH MINIMUM LABOR & COST**



BLACK DIAMOND PRECISION DRILL GRINDER

High priced skilled labor used on grinding drills is costly, wastes time—because any unskilled laborer with a single Black Diamond machine, can produce quantities of precision ground, small gauge and fractional drills with—lips of uniform length—correct angle and proper clearance. And with the Web Thinning attachment he can grind Notched—Colton or Crank Shaft Points just as efficiently.

If you use small drills, singly or in gangs—you can save valuable war production time, labor and money by installing a Black Diamond Drill Grinder at once.

Write for full details.

BLACK DIAMOND SAW & MACHINE WORKS, INC.

45 NORTH AVENUE

NATICK, MASSACHUSETTS



BAUMBACH

STANDARDIZED

DIE SETS

Machined Steel Semi-Steel

Standardized Die Sets, embodying many exclusive features, a listing of more than 195,000 stock sizes and 46 different styles afford a service that is unsurpassed.

Send for Our New Catalog

E. A. BAUMBACH MFG. CO.

1806 S. Kilbourne Ave. Chicago, Ill.

IMMEDIATE DELIVERY

S & A

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MANDRELS



Precision made of Tool Steel, Hardened and Accurately Ground.

Write for Information

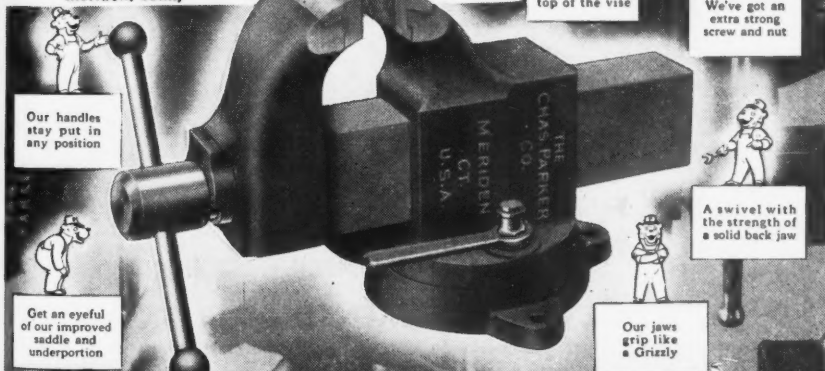
STANDARD SIZES AND PRICES

SCHULTZ & ANDERSON CO.

113 EDISON PLACE, NEWARK 5 N.J.

Up-to-the-minute design • readily replaceable steel jaws, covering entire top of vise and **PINNED** on • exclusive swivel base construction which utilizes the principle of the automobile brake with shoes that grip the sides the full 360° • tension spring which prevents the handle from slipping and pinching the operator's hands • close-grained castings from our own foundry • skillful machining - add up these features and you will know why Parker Vises - America's oldest - are also its best.

THE CHARLES PARKER CO.
Meriden, Conn.



Our handles stay put in any position

Get an eyeful of our improved saddle and underportion


Our renewable tool steel jaws cover the entire top of the vise

We've got an extra strong screw and nut

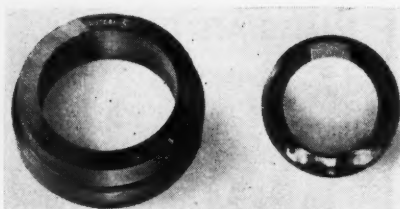
A swivel with the strength of a solid back jaw

Our jaws grip like a Grizzly

PARKER VISES



America's Oldest



New Method Engraved Knockout Pads

ures and numbers are engraved on the upper surface of each pad, making it a combination knockout pad and marking die.

In use, the knockout pad, backed by springs, numbers the bottom portion of the stamping during the actual drawing process and then lifts the finished piece out of the die after the male half of the forming die has been withdrawn.

Sublan for Rust Protection of Steel Surfaces

A product for protecting highly polished steel surfaces from the corroding effects of acid, salt water, and humid-

ity, to be known as Sublan, is now being marketed by Glyco Products Co., Inc., 26 Court St., Brooklyn 2, New York.

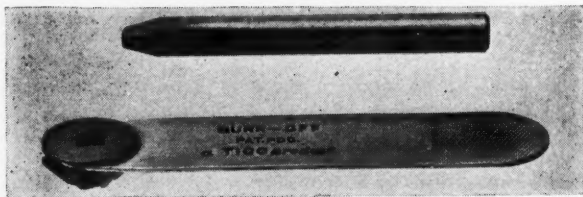
Diluted with an equal amount of thin, acid-free mineral oil, Sublan provides a mixture into which parts can be cold dipped to receive anti-corrosion films. In addition to protecting the parts from the corroding effects of acid, salt water, and humidity, the films are said to suppress latent fingerprints on the polished steel surfaces. The films are readily removable from the surfaces by cold solvent wash or dip.

Wood Hydraulic Upsetting Press

In the production of lightweight tubular railway axles, the Wood Hydraulic Upsetting Press illustrated herewith, product of The R. D. Wood Co., 400 Chestnut St., Philadelphia 5, Pa., is said to play a leading role. After one end of the seamless steel tubing is heated, it is delivered to the press where, by means of external dies and an internal mandrel, the tube end is upset to the desired dimensions. This operation is then repeated for the other end.

The press, including pump and ac-

"BURR-OFF"



For Removing Burr or Chamfering Holes and Slots of Fork-Shaped Parts.

EFFICIENT • DURABLE • SIMPLE • INEXPENSIVE

TOOL IMPROVEMENTS CO., INC.

SEAFORD,

NEW YORK

General Sales Agents:

John H. Graham and Co., Inc., 105 Duane St., New York, N. Y.

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, 1944

REYNOLDS COOLANT UNITS ARE EFFICIENCY EXPERTS!



Showing Reynolds
No. 1-S attached to
milling machine

Designed to promote
peak performance in
machines using a
coolant (cutting or
soluble oils), Rey-
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are the answer to de-
mands for increased
production and
longer cutting tool
life.

REYNOLDS MACHINERY CO.

211 EDDY STREET, PROVIDENCE, R. I.

Leveling Made Easy!

4 sizes: 2 3/4", 3 3/4",
5 3/4" and 7 1/2" closed
heights. Self-leveling
ball and socket cap.



Simplex Machinists'
Jacks cut costs by speed-
ing leveling of work on
planers, milling machines
and other tools. Side
lock nut holds screw at
desired height. No. 3A, 3" high, is extended
further by inserting 1" pipe in base or 1/2"
pipe in cap. Ask your dealer.

Templeton, Kenly & Co.
Chicago 44, Ill.
Better, Safer Jacks Since 1899

Simplex
LEVER - SCREW - HYDRAULIC
Jacks



July, 1944

GAGES



In 48 Hours

(IN MANY SIZES)

Plug Gages, Ring Gages, Snap
Gages (Adjustable and Solid)
Built-up Gages, Flush-Pin Gages,
Special Gages.

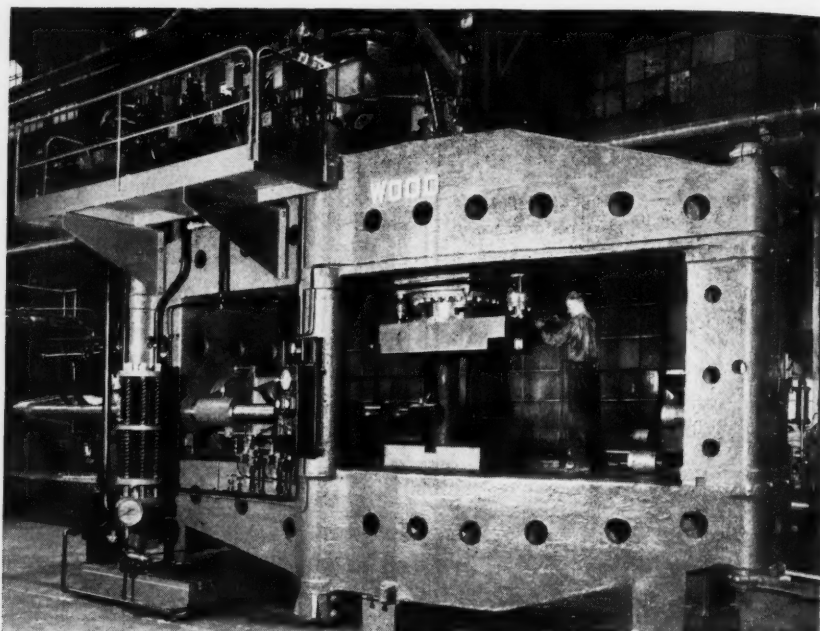
Our Good Gages:

Prevent Spoilage, Utilize Less Skilled Help
Speed-Up Operations, Reduce Costs

EASTERN PRECISION GAGE CO.
318 Bayway Elizabeth 2, N. J.

We operate day-and-night and Sunday
Phone us at any hour
ELIZABETH 2-9519

Send for illustrated folder—M



Wood Hydraulic Upsetting Press

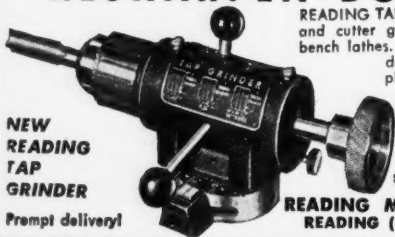
cumulator operating system, is designed for accessibility on all sides. Rigidly constructed, the press operates on a semi-automatic cycle basis. The 28-inch diameter clamping ram, with 12-inch stroke, first clamps the tube before the guided horizontal ram can start its work stroke. When the work stroke is completed, the 23 x 22-inch diameter horizontal ram strips from the tube before clamping ram pressure is dissipated.

The vertical ram has a 900-ton ca-

capacity and the upsetting ram, a 600-ton capacity. Resistance post is provided with adequate adjustment. An air cylinder is arranged so as to move a space block into position when the tube is turned around for upsetting the second end.

In order to conserve high pressure fluid, an auxiliary horizontal ram stripper is provided. This 11-inch diameter stripper serves only to strip the mandrel from the tube. A stripping force of

RESHARPEN DULL TAPS



**NEW
READING
TAP
GRINDER**

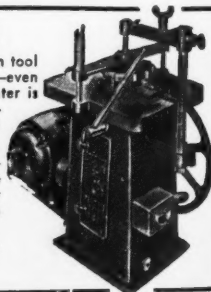
Prompt delivery!

READING TAP GRINDER can be used on tool and cutter grinders—surface grinders—even bench lathes. Taps sharpened after center is destroyed. **No collets.** Complete. No extras. Write!

Broach Keyseater

The Reading Bench Machine does not require bushings or guides. Very fast capacity from 1/8 to 3/4 cutter. Low first cost.

**READING MACHINE COMPANY
READING (CINCINNATI), OHIO**



CUTS MANY PATTERNS WITH STRAIGHT KNURLS



Graham Adjustangle Knurl Holder



Adjusts to produce various patterns of straight, spiral and checkered knurling, all with straight knurls. Handles work up to 2½" dia. Shank made to fit your turret.

Request Illustrated Price Circulars.

GRAHAM MFG. CO.

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EAST GREENWICH, R. I.

STOP

GRINDING WHEEL WASTE WITH METCALF DRESSERS

Eliminate the waste caused by ordinary dressers—dress your wheel with a Metcalf. Easy to hold. Cuts bond between the cutting particles of the wheel—leaves sharp, clean cutting, longer lasting surface... Write today for full details.



DEALERS
Write

COVEL-HANCHETT CO.

BIG RAPIDS, MICHIGAN

MEASURING A PLUG GAGE with LIGHT WAVES

using an optical flat, a toolmaker's flat and a gage block

The formula is:

$$D = h + \frac{(.000012 \times N \times W)}{W}$$

Substitute the actual values

$$D = .750 + \frac{(.000012 \times 3\frac{1}{2} \times 1\frac{1}{16})}{.01}$$

and get the answer

$$D = .750168 \text{ inch.}$$

It's just that simple!

Write for new, free Lightwave
Measurement Booklet.



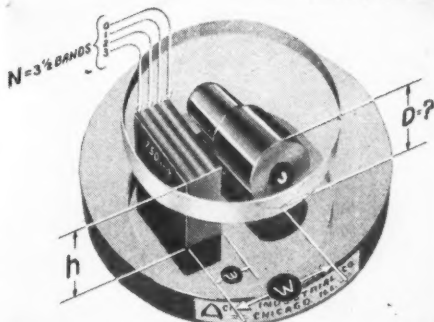
ACME INDUSTRIAL COMPANY

Makers of Standardized Jig and Fixture Bushings

212 N. Laflin St.

Chicago, Ill.

MONroe 4122



approximately 175 tons is thus provided for a stroke of from 0 to 6 inches, after which the pull-back force reduces to about 32½ tons.

A reciprocating type power pump installed in connection with the press provides a working pressure of 3,000 lb. Press, pumping and piping system comprise a complete recirculating unit.

Lempco Model "R" High-Speed Steel Expansion Reamer

Designated as the Model "R," a high speed steel expansion reamer having three cutting blade segments is now being offered by Lempco Products, Inc., 5717 Dunham Rd., Bedford, Ohio. An adjusting lock nut included in the design of the tool is said to hold the three cutting blade segments absolutely rigid and thus prevent any possibility of an oversize bore resulting when the blades are subjected to excessive pressures.

The three blade segments are arranged so that two spiral in a direction opposite to that of the third, simul-

taneously. This opposite-spiraling effects a shearing action which is said to enable the tool to finish-ream mirror-smooth any machinable metal, ferrous or non-ferrous, as well as laminated



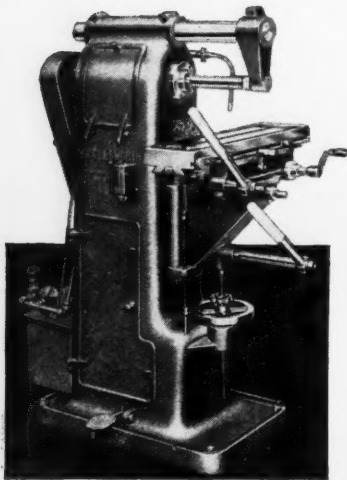
Lempco Model "R" Hi-Speed Steel Expansion Reamer

phenol-formaldehyde and other fibrous plastics ordinarily difficult to machine smoothly. The removable blades can be quickly and easily re-sharpened and provided with 0.035 to 0.090-inch straight-line expansion, thus enabling them to maintain their size and keen cutting edge over unusually long period of use.

The Lempco Model R Hi-Speed Steel Expansion Reamer is available with extensions, pilots, and taper bushings for line reaming and with Nos. 1 to 5

Small Parts **MILLER**

With Added Power Longitudinal Feed



**BUILT-IN ACCURACY
1 H.P. MOTOR-IN-BASE DRIVE
TIMKEN BEARING SPINDLE**

The No. 3 WIGGLESWORTH MILLER produces a fine finish, free from chatter marks on small parts within its range. Particularly adaptable to the manufacture of small arms parts.

Drive is through a pair of 45° angle spiral gears in the saddle to the worm. The feed gear mechanism consists of a set of planetary gears. Drive to table is taken from a 3-step cone pulley on rear of spindle to a 3-step pulley in feed shaft. Planetary gears provide proper speed reduction to spindle to give proper feed rates to table. Six spindle speeds are obtainable from 150 to 800 r.p.m.

IMMEDIATE DELIVERY WITH HIGH PRIORITY

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**WIGGLESWORTH
MACHINE TOOL CO. 191 BENT ST.
CAMBRIDGE, MASS.**

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pulley
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speed
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Y ST.
MASS.

, 1944



SAFE

DAYTON SAFETY LADDERS

have every advantage

No extra man needed to steady—Roomy platform for men and tools. Great strength, lightweight. Guard rails on platform—Automatic locking. Folds compactly

Airplane spruce is used throughout. Steel braces. Safety shoes. Sizes 3' to 16' in height—Elevating platform adds extra height to Dayton Ladders. Write today for prices, catalog

DAYTON SAFETY LADDER Co.

121 - 23 THIRD ST. CINCINNATI, OHIO

Bright Scale Free

HEAT TREATING



Our plant, with its large tonnage capacity, insures quick deliveries. S.A.E. and N.E. Steels... Heat treating non-ferrous metals. All government specifications fully met. Send samples for treatment and quotations. Write or phone Trenton 3-9984.

**Normalizing
Annealing • Cyaniding
Carburizing • K-Monel Aging**

Pyroelectric Co.

COMMERCIAL HEAT TREATING

1150 Southard St., Trenton, N. J.

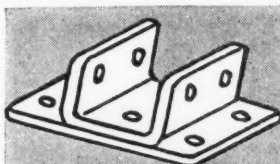
18 WAYS TO SAVE TIME & MONEY with the MEAD Industrial Burring Machine

New circular explains, illustrates 18 ways in which the Mead Industrial Burring Machine saves time and money—also contains special Grit Guide. Every industrial plant needs this "Jack-Of-All-Trades" machine.

Your burring can be done in "free time"—install these machines by every machine tool which leaves burrs. Grinds, finishes both outside and inside cut-out openings. Immediate delivery in most cases. Write for the informative Money-Saving circular now.

Mead Specialties Co.

15 S. Market St.
Dept. 74-A
CHICAGO 6, ILL.



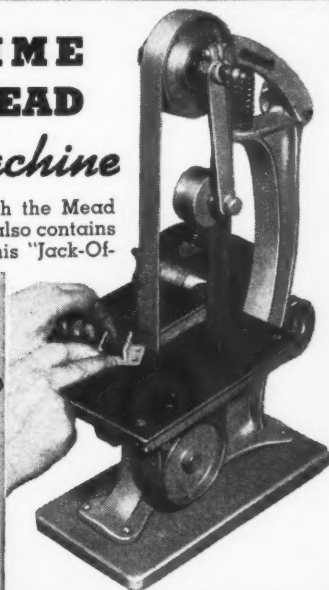
Formed Stamping
Round Off Corners. Remove
Tapping Burrs



Die Cast Spider
Clean Out Flash
in Corners



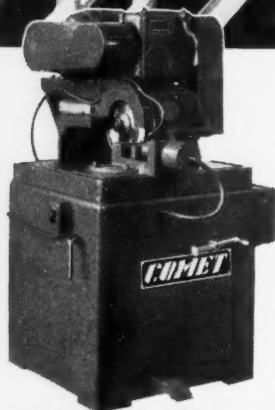
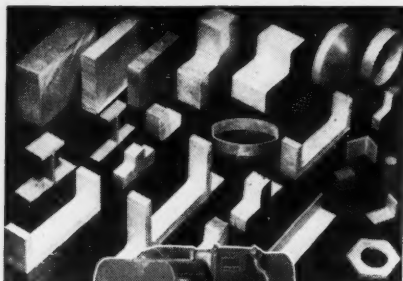
Screw Machine Cam
Grind Edges to
Smooth Fair Curves



For METAL—PLASTIC—WOOD

July, 1944

MODERN MACHINE SHOP 325



CUTS METAL FASTER *More Accurately*

If you require accurate, high-speed cutting of non-ferrous metals and other materials, here is your machine. Cuts by smooth, fast, milling action. Pneumatic hydraulic feed is coordinated with speed of cutting blade. Vise synchronized with action of ram. No vibration because of weight distribution. Has 4 speed transmission and variable feed mechanism. Built-in coolant system. Properly operated, blade breakage is eliminated. Write or wire for free literature.

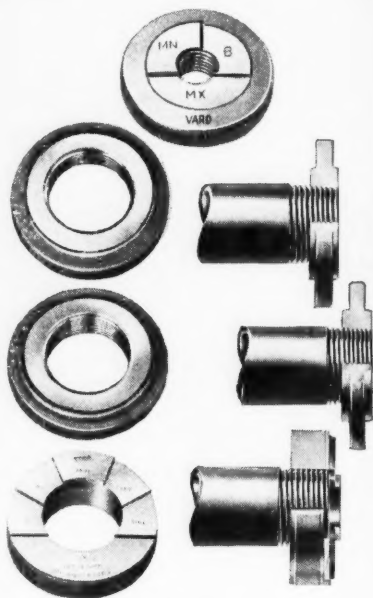
CONSOLIDATED MACHINERY & SUPPLY CO., LTD.
2031 SANTA FE AVE., LOS ANGELES, 21, CALIF.

COMET
AUTOMATIC CUT-OFF MACHINE
MODEL MH

Morse taper shank. The reamer is also available with butt shank for use in turret lathes.

Vard Tapered Pipe Thread Ring Gages

A set of pipe ring gages which is said to meet all requirements for gaging external taper pipe threads on hy-



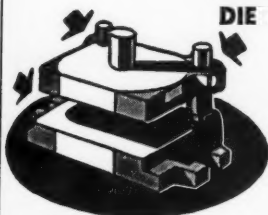
Vard Tapered Pipe Thread Ring Gages

draulic fittings for aircraft is now being manufactured by Vard, Inc., 2931 E. Colorado Blvd., Pasadena 8, Cal. The gages are claimed to comply with American Gage Design Standards and are made to Army-Navy specifications AN-GGG-P-363. They are constructed of selected tool steel, hardened, ground and finished to specified tolerances.

The Vard Tapered Pipe Thread Ring Gages are made in three primary types: The L-1 type which is a thin ring for checking lead, pitch, diameter, and taper of threads a minimum thread length; the L-2 type for checking thread

DANLY

**PRECISION
DIE SETS**



**Danly
Commercial Sets
Danly
Special Sets**

**DANLY MACHINE
SPECIALTIES, INC.**
2100 S. 52nd Ave.,
Chicago, Ill.

**THEIR
PRECISION
Means Greater
Accuracy
In Your
Production**

Milwaukee • Long Island City, N. Y. • Dayton
Detroit • Rochester • Cleveland • Philadelphia

DUCOMMUN METALS & SUPPLY CO.
Los Angeles • San Francisco

DANLY PRECISION DIE SETS

INSTRUMENT MOUNTING STRUCTURES

The centralization of electrical controls is being done in most plants today. Littleford Mounting Structures are fabricated to house such controls. When in need of Mounting Structures, send blueprints to Littleford.



LITTLEFORD

LITTLEFORD BROS., INC.
433 E. Pearl St., Cincinnati 2, Ohio

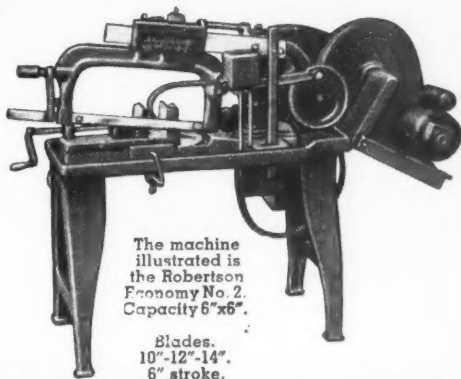
Robertson's ECONOMY Power Hack Saws

FEATURES

Rugged Simplicity Long Life
Hairline Accuracy High Speed
Long Blade Life Large Bearings

Few Adjustments
Hydraulic Lift on Back Stroke

*Write for information
and delivery dates.*



The machine illustrated is the Robertson Economy No. 2. Capacity 6"x6".

Blades.
10"-12"-14".
6" stroke.

There is a ROBERTSON ECONOMY SAW for every cutting job

W. ROBERTSON

MACHINE & FOUNDRY CO., INC.

32 RANO ST.

BUFFALO 7, N. Y.

form, pitch, diameter, and taper of threads at full length of effective thread; and the plain taper ring with six steps for checking the truncation on the major diameter taper threads.

The L-1 and L-2 type ring gages are also available with minimum and maximum notches, in which case they are identified as L-1-B and L-2-B. According to the manufacturer, the advantage of these Type B gages is that they enable inexperienced inspectors to check faster and more accurately.

Industrial Films

Sound-Film: "Magnesium—Metal from the Sea"

The Bureau of Mines has announced release of a new educational sound motion picture, "Magnesium-Metal from the Sea," which describes how this essential material is created from common sea water and from salt brines.

The new film, available for free use by the public and private schools, war-training classes, the armed forces, civic

groups, and other organizations, is in 16-millimeter sound and was produced in cooperation with a large industrial firm, Dr. R. R. Sayers, Bureau Director, reported to Secretary of the Interior Harold L. Ickes. The picture has a running time of 23 minutes.

The picture describes in easily understood terms how sea water is made to yield the glistening metal. The story is unfolded both by animation and by views of magnesium-production plants and equipment.

Applications for free short-term loans of the film "Magnesium—Metal from the Sea" should be addressed to the Bureau of Mines Experiment Station, 4900 Forbes Street, Pittsburgh 13, Pa., and should state specifically that the borrower is equipped to show 16-millimeter sound films. No charge is made for use of the film but the exhibitor is expected to pay transportation charges and for loss or damage other than normal wear.

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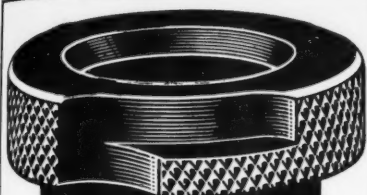
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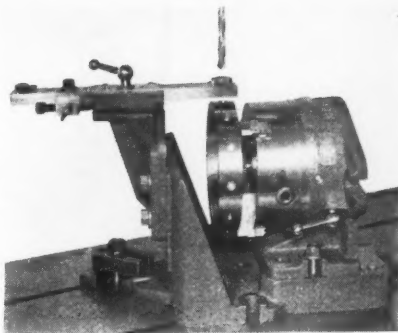
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ization, a sound slide film program involving two separate films with their accompanying recordings on the metallic arc welding of tools and dies.

Part No. 1 is entitled "Let's Get the Low Down" and treats of Eureka tool steel welding electrodes. It is divided into five sequences, the first of which is concerned with a typical breakdown in a plant and shows how a bottleneck in production was quickly eliminated. Sequence No. 2 deals with certain facts discovered in the development of metallic arc welding tool steel electrodes and the place these facts have found in industries.

Sequence No. 3 is concerned with the number of different brands of tool steels on the market and breaks them up into their various typical classifications. Sequence No. 4 treats of typical questions that are paramount in the minds of plant personnel in connection with tool steel welding and the answers to same. Sequence No. 5 deals with testimonials in connection with the benefits derived from metallic arc welding.

Part No. 2 of the program is entitled "Let's Do It Right" and deals entirely with the proper application of metallic arc welding tool steel electrodes, breaking down each of the different steps of

the sequence necessary in the proper application of these types of rods.

This program can be exhibited to plant personnel through the company's distributor organization throughout the United States, or the films and recordings can be purchased at a nominal fee for use in plant training programs. They are also available for use by educational institutions.

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The Jam Handy Organization, 2900 E. Grand Blvd., Detroit 11, Mich., has produced, in cooperation with the Carnegie-Illinois Steel Company, a series of five sound slide films dealing with the fundamentals of handling men in factories, plants, and mills. Each slide film is synchronized with voice on disc record, and an instructor's manual accompanies the series.

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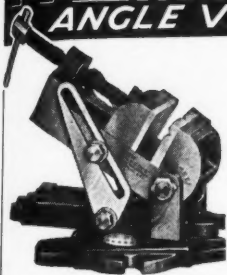
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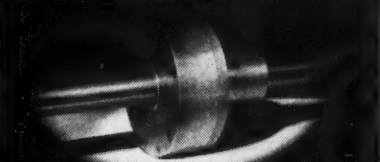
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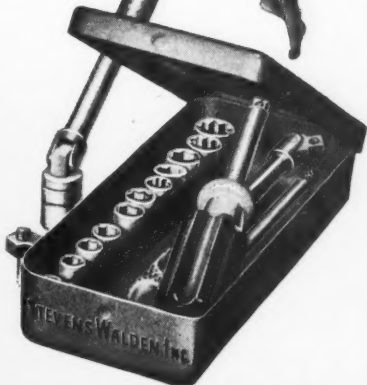
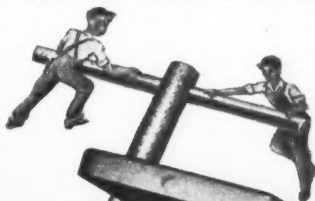
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New Books

Work Methods Manual. By Ralph M. Barnes. Published by John Wiley & Sons, Inc., 440 4th Ave., New York, N. Y. 136 pages. 110 figures. Cloth

binding, board covers. Price, \$1.75.

A guide for supervisors, foremen, and workers on the principles of work organization and motion economy, this book, according to the publisher, contains the same principles and techniques that are used in training professional industrial engineers. Although the subject of stop-watch time study and rate setting has been omitted, the book contains a full discussion of process charts, man and machine charts, and operation analysis. Ten principles of motion economy which have widest application have been included, with specific illustrations indicating how they may be applied and showing what results may be expected from their use.

Several series of photographs have been used to aid in defining fundamental hand motions, thus enabling the reader to master this classification of hand motions without the tedious task of memorizing definitions. The material on hand motions is included as a separate chapter so that it may be omitted when sufficient time for discussion of this subject is not available.

Contained in the "Work Methods Manual" are ten chapters which are headed as follows: Introduction; Developing a Better Method; The Job Breakdown; Process Charts—Flow Diagrams; Activity Charts—Man and Machine Charts; Operation Analysis—Right and Left-Hand Charts; Fundamental Hand Motions—Motion Analysis—Simo Charts; Ten Principles of Motion Economy; Ten Principles of Motion Economy (Continued); Putting the New Method into Effect. Problems and an index are provided at the rear of the book.


Materials and Processes. By James F. Young. Published by John Wiley & Sons, Inc., 440 4th Ave., New York, N. Y. 628 pages. Cloth binding, board covers. Price, \$5.00.

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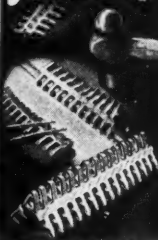
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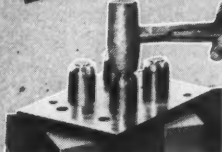
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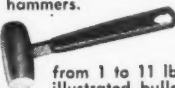


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The book considers chiefly the materials and processes used in manufacturing electromechanical products. Sufficient metallurgy is included to enable the engineer to understand heat treating practice and the effects of various processes on metallic materials. In the discussion of processes, sufficient detail for understanding the basic nature of each process is given; however, throughout, emphasis is placed on so designing the products that they can be easily processed. Many chapters of the book have been written from lectures given in a general course in materials and processes conducted in the Advanced Engineering program of the General Electric Company.

"Materials and Processes" comprises a total of 19 chapters which are divided into two parts. Under Part I (Materials) are the following chapters: The Nature of Pure Metals; Alloys; Mechanical Properties of Metals; Iron and Steel; Nonferrous Metals and Alloys; Heat Treatment; Corrosion; Magnetic Properties of Materials; Electrical Properties of Materials; Electrical Insulation; Plastics and Their Molding. Part II (Processes) includes these chapters: Casting Processes; Powder Metallurgy; Hot Working Processes; Cold Working Processes; Welding and Allied Processes; Machining; Gaging, Inspection, and Quality Control; Cleaning, Plating, and Finishing of Metals.

Engineers' Dictionary, Spanish-English and English-Spanish. By Louis A. Robb. Published by John Wiley & Sons, Inc., 440 4th Ave., New York, N. Y. 423 pages. Cloth binding, flexible covers. Price \$6.00.

As the result of the demand for a comprehensive dictionary of Spanish and English equivalents designed to meet the needs of engineers of the two Americas, this volume has been published. Many months spent in Spanish-speaking countries afforded the author opportunity for the accumulation of material as well as for contacts with engineers of those countries.

The field of this book is the vocabulary of civil engineering in all its branches, both in the office and on the job. Many mechanical and electrical terms are necessarily included, as well as some of the terms of geology, chemistry, and other sciences. No attempt is made to deal thoroughly with mechanical or electrical engineering or with any subject except civil engineering and construction.

The engineering terminology of Spanish America differs from that of Spain, and there is considerable variation in the use of words among the eighteen Spanish-speaking republics themselves. In this volume, local terms are qualified by abbreviations indicating the countries where they are used. Some of these terms are alternative expressions for more generally accepted forms.

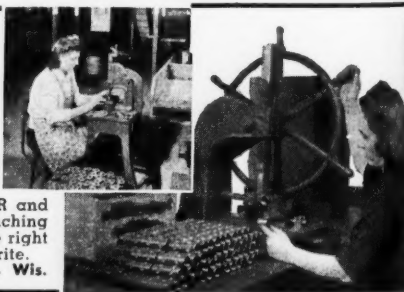
In covering the subject, the Spanish terms, if not furnished by the experience of the author, have been taken from Latin-American engineering publications or from manufacturers' Spanish catalogs. Proprietary names have been included if they are well known and if Spanish equivalents for them are in use.

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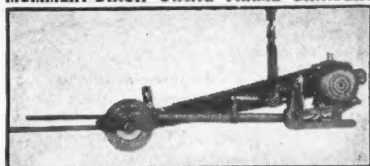
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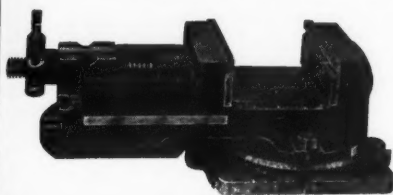
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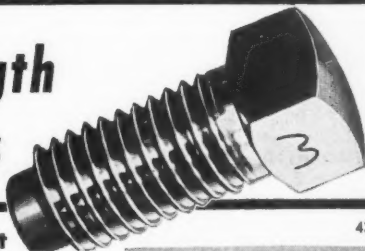
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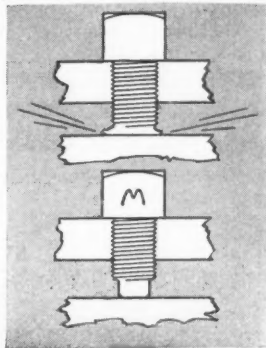
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Ferrous Metallurgy, Volume I. By Ernest J. Teichert. Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18, N. Y. 484 pages. Cloth binding, board covers. Price, \$4.00.

The first of a three-book series prepared by E. J. Teichert, supervisor of Metallurgy Extension of The Pennsylvania State College, to provide a three-year course of training for persons interested in the iron and steel industry, this book covers those fundamentals essential to an understanding of the work to follow and includes information on the primary processing of iron ore in the blast furnace and the manufacture of cast iron, wrought iron, and crucible steel.

According to the publisher, every known care has been exercised to present the subject matter as clearly and concisely as possible. The extent of the work, however, prevents a treatment of all subject matter in minute detail. The student is expected to read the many references given for a more detailed description of the processes covered.

Contained in the book is a total of 13 Chapters which are headed as follows: Chemistry—General Inorganic; Chemistry—General Organic; Applications of Chemistry; Physics—General; Physics—Electricity; Pyrometry; Metallurgical Fuels and Their Combustion; Refractories—Fluxes—Slags; Manufacture of Pig Iron; Iron Founding; Malleable Cast Iron; Wrought Iron; The Cementation and Crucible Steel Processes.

Ferrous Metallurgy, Volume II. By Ernest J. Teichert. Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18, N. Y. 487 pages. Cloth binding, board covers. Price, \$4.00.

This second volume of the three-book

series prepared by E. J. Teichert, formerly supervisor of Metallurgy Extension of the Pennsylvania State College, for use in connection with a program of training for persons interested in the iron and steel industry, covers all the common methods employed in the manufacture and processing of steel, including its primary fabrication.

Every known care is said to have been exercised to present the subject in as clear and concise a manner as possible. The extent of the work, however, prevents treating all the subject matter in minute detail. It is believed that the student of this text will obtain a very clear picture of all the processes covered.

The 18 chapters comprising the book have the following headings: The Steel-making Process; The Bessemer Processes; The Basic Open-Hearth Process; The Acid Open-Hearth Process; The Electric Furnace Process; The Special Steelmaking Process; The Steel Ingot; The Fabrication of Steel; General Methods of Fabrication; General Factors Affecting Rolling Operations; Rolling Mill Practice; The Manufacture of Steel Strips, Sheet, and Coated Products; The Manufacture of Steel Wire; General Welding Methods; Manufacture of Tubular Products; Forging Practice; Steel Foundry; Specifications.

Plastic Working of Metals and Non-Metallic Materials in Presses. Third edition. By E. V. Crane. Published by John Wiley & Sons, Inc., 440 4th Ave., New York, N. Y. 540 pages. 426 illustrations. Cloth binding, board covers. Price, \$5.00.

In this third edition of "Plastic Working of Metals and Non-Metallic Materials in Presses" three chapters have been

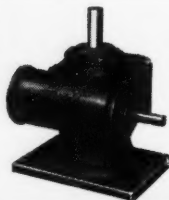
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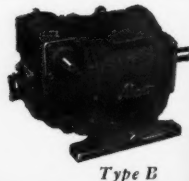
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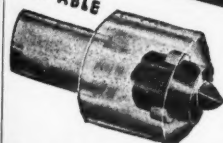
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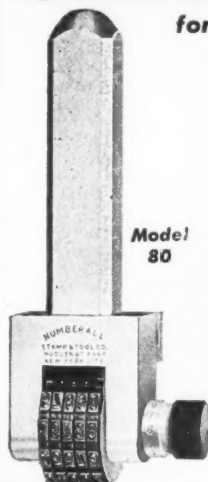
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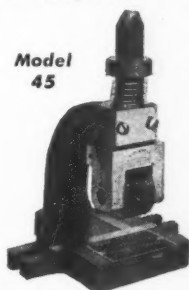
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MODERN MACHINE SHOP 337

added along with new material in the appendix and through the text to present the broadened view of plasticity and mass production.

Chapter XV discusses the use of semi-permanent die materials in more flexible presses for limited lot production. Chapter XVI goes into the behavior of the many types of materials in the several states of plasticity, correlating the data now available with that presented relative to metals in the earlier chapters. Chapter XVII considers the application of plastic flow methods to the molding of non-metallic as well as metallic powders and to the forming of sheet plastics and composite laminates. Illustrations of tools, equipment, and methods from many industries merge into a common picture which throws considerable light on the planning of new products.

In addition to 426 illustrations, the book contains some 35 tables and 13 charts. Complete contents are as follows: Mass Production; Essential Metallurgy; Shearing Metal in Dies; The Shearing Group of Press Operations; Bending Operations; Expanding, Contracting and Curling; Cold-Working of Plastic Metals; The Drawing Group of Press Operations; Drawing Speed, Lubrication, Annealing; Cold Operations of

the Squeezing Group; Extrusion; Hot Press Forging; Press Characteristics and Modifications; Automatic Production; Diversified Production; Plastic States, Metallic and Non-Metallic; Molding and Forming; Appendix I—Graphical Computations and Tables; Appendix II—Problems; Index.

Angular Spacing Tables. By Dr. Werner F. Vogel. Published by Vinco Corp., 8861 Schaefer Highway, Detroit 27, Mich. 233 pages. 200 tables. Plastic binding, board covers. Price \$10.00.

This book is the result of a need for convenient and accurate mathematical tables for use in connection with the Viro optical master inspection dividing head. An endeavor has been made to prepare a series of tables from which every possible mathematical and human error has been eliminated before publication. Contained in the volume is the included angle between any point of beginning and any one or more divisions of a circle up to and including 200 divisions.

The method of using the tables is simple. The index column on each half page corresponds to the number of teeth, and the reading in degrees, minutes, and seconds with decimals is found in a horizontal line opposite each index. Since checking instruments are not designed to read closer than one second, a star is placed opposite the second when the remaining decimal part of that second is in excess of 0.500.

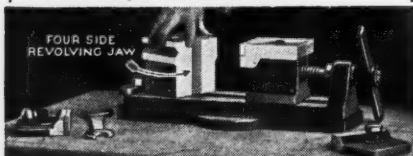
An appendix has been added to show the values of the fundamental dividing angle $90^\circ/N$, $180^\circ/N$, and $360^\circ/N$ and other important constants tabulated with a hitherto unpublished number of digits. These fundamental dividing angles are given in three different units—in degrees, minutes and seconds; in degrees and decimals of the degree; and in radians. A new type of conversion table, converting minutes and seconds in one reading to decimals of the degree, has been included. In another table, a single reading converts an optional sequence of decimals, hundredths, and thousandths of the second to decimals of the degree.

Engineering Drafting Problems. By Kenneth E. Quier. Published by Harper & Brothers, 49 E. 33rd St., New York, N. Y. Loose-leaf design. 80 plates. Price, \$2.50.

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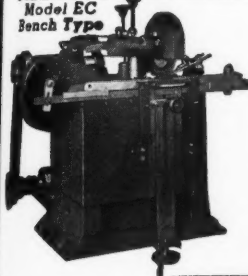
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The drafting-room projects provided in this book are designed to develop the ability to read blueprints and to make mechanical drawings in as short a period of time as possible consistent with a sound working knowledge of principles and practices employed in engineering. The layouts aim to minimize pure copy work, to develop resourcefulness, and to increase one's ability to visualize objects in three dimensions. Their order is progressive and any standard textbook on mechanical drawing can be used to supplement this course of study. Recent developments of the American Standards Association have been followed and problems have been carefully selected which not only illustrate basic principles but also have practical industrial applications.

Contents of the book range as follows: Preface; Suggestions on Plate Use; Objectives and Instructions, Plates 1-80; Lettering; Geometric Construction; Three-Dimensional Study; Engineering Drawings; Dimensioning; Sectional Views; Auxiliary Views; Revolved Views; Fastenings; Intersections; Developments; Pictorial Drawings; Perspective Drawings; Lofting Drawings; Technical Sketching; Cams; Gears; Bearings; Welding; Production Tools; Assembly Drawings; Roof Truss; Column Detail; Beam Detail; Piping Drawings; Salt Separator; Vacuum Shelf Dryer; Circuit Drawing; Wiring Diagram; Circuit Breaker Detail.

Blueprint Reading. By Fred Nicholson and Fred Jones. Published by D. Van Nostrand Co., Inc., 250 4th Ave., New York, N. Y. 141 pages. Cloth binding, board covers. Price, \$2.00.

In writing this book, the authors have endeavored to overcome some of the handicaps confronting the teachers of

blueprint reading. The material and method of presentation are based upon many years of experience in the field of vocational education.

The main body of this work consists of 50 lessons and 50 blueprints for study. In each lesson, something new has been added. Except for the last plate, each print has been considered as a separate unit. For this reason title blocks have been omitted. On many of the lesson sheets in the book, pictorial drawings are shown in addition to the working drawing to help the student to visualize the object shown on the working drawing. Lesson material for sketching and clay modeling has been provided.

A brief review of arithmetic has been included in the text, since the authors have found that many students are handicapped because of their inability to solve ordinary mathematical problems. It is suggested that the work on arithmetic be assigned to the students who need it before starting on the plates on blueprint reading.

In addition to learning how to read a blueprint, the authors hope that the student of this text will be able to interpret the language of industry and know what must be done in the shop to accomplish the purpose of the designer.

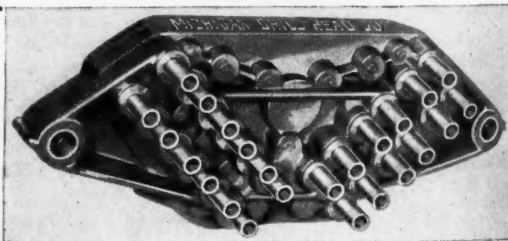
Basic Problems in Descriptive Geometry. By William Wirt Turner and Carson P. Buck. Published by The Ronald Press Co., 15 E. 26th St., New York 10, N. Y. 60 plates, 8½x11 inches. Punched for standard binder. Price, \$1.75.

This concise series of work sheets in descriptive geometry is based on third angle projection, is general in character, and is prepared for use with any standard textbook in descriptive geometry which employs the direct or auxiliary plane method. The series is composed of carefully chosen problems which have

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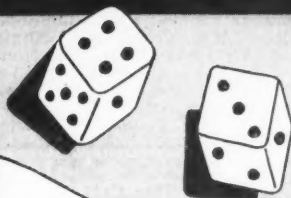
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Contents of "Basic Problems in Descriptive Geometry" are as follows: Orthographic Projection; Auxiliary Principles; True Length and True Angle; Basic Constructions—Lines and Planes; True Size of Planes; Perpendicular Relationships of Lines; Piercing Points; Non-Coplanar Forces; Perpendicular Relationships—Lines and Planes; Angle of Line and Any Plane; Intersection of Planes; Dihedral Angles; Mining Problems; Intersections and Developments; Revolutions.

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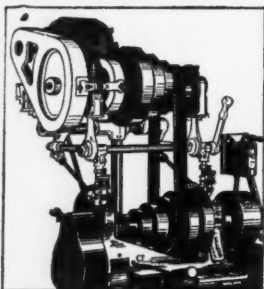
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Aircraft Sheet Metal Work. By C. A. LeMaster. Published by American Technical Society, Drexel Ave. at 58th St., Chicago 37, Ill. 388 pages. 177 illustrations, 56 tables. Cloth binding, board covers. Price, \$3.75.

A "how-to-do-it" book, this work is designed to serve as a basic course of instruction for apprentices and other students of aircraft sheet metal work and as a refresher for mechanics who are more or less experienced in the work of this trade. The author has had many years of experience as a mechanic in the trade and as a teacher of apprentices, and is a member of the United Air Lines supervisory staff.

The first few chapters of the book deal with safety rules, personal and shop-furnished tools, and blueprint reading. These are chapters of special importance to beginners. The chapter on tools not only explains what they are, but shows how to use them. Reading of blueprints is clearly explained in a how-to-do-it manner entirely independent of mechanical drawing and other subjects not required of sheet metal workers.

The other chapters progress from simple to more complicated processes and operations. Emphasis is always placed on how to do the work—how to rivet, how to weld, how to use the drop hammer, how to figure bend allowances, and all the other things the sheet metal worker must be able to do before he can be classed as an expert. To further increase the how-to-do-it aspect of the book many simple yet practical projects have been included at the end of

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those chapters which deal with processes. These projects are progressive in line with the chapter content, and can be done using few and ordinary tools and but little material.

Many instructive pictures showing actual operations in the shop, plus an even greater number of drawings, are used throughout the book to illustrate typical sheet metal work and the principles explained. Another very helpful feature is the series of questions or questions and answers that appear in connection with most chapters. In addition, explanations relative to the materials a sheet metal worker encounters have been included so as to acquaint him with their properties, especially in regard to working, heat treating, strengths and values.

Contents are as follows: Hints for Safety and Production; Tools; Files and Their Uses; Blueprint Reading; Measuring and Measuring Tools; Template Layout and Bench Work; Pattern Development for Bends; Rivets and Riveting; Skin Fitting, General Fabrication; Soldering, Brazing, and Welding; Use of Drop Hammer; Assembly, Repairs, Techniques, Projects; Aluminum and Related Metals; Steel in Aircraft Construction; Index; Decimal Equivalent Table.

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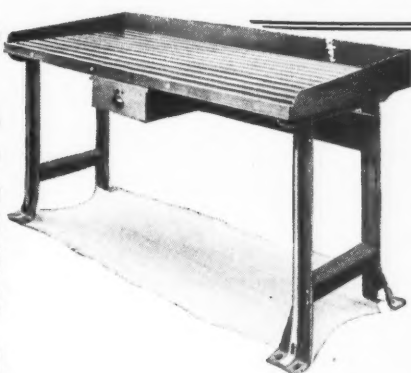


Fig. 928. "HALLOWELL" Steel Work-Bench. Drawer is extra. Pat'd. and Pats. Pend.

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Trade Literature

"Production Today with DoAll Products" is the title of an interesting 36-page booklet now being distributed by the DoAll Service Co., 1201 Thacker St., Des Plaines, Ill. The booklet is fully illustrated and briefly defines the following DoAll products manufactured by Continental Machines, Inc., The Savage Tool Company, The Speedmaster Company, File Bands, Inc., The DoAll Company, and Alloy Metals Division: contour and high speed sawing and filing machines with their many attachments for shaping and fabricating all types of materials; saw and file bands used on DoAll machines; hack saws; automatic saw band butt welder for welding saw bands from $\frac{1}{8}$ to 1 inch in width; Saw Eez; cutting oils and coolants; surface grinding machines for toolroom and production uses; Selectrons; chucks; dust collectors; coolant systems; grinding wheels; abrasive bands; gage blocks and gage inspection laboratory sets; "Speedmaster" variable speed pulleys; layout ink having satin-like luster; hydraulic presses for producing powdered metal products.

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a brief description of the free courses offered by the DoAll Trade School in training men for contour machining, precision grinding, precision measuring, and powder metallurgy. Copy of booklet free upon request.

"Cutting Fluids." The Engineering Division of the Standard Oil Co. of New Jersey, 26 Broadway, New York 4, N. Y., now has available a 16-page brochure on Esso Cutting Fluids. The brochure contains photographs on the selection and

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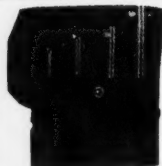
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Wales Hole Punching Units. A 28-page catalog featuring illustrated, descriptive and tabular information on Wales "AA," "C," "CA," and "Z" Hole Punching Units for use on press brakes and stamping presses is announced by the Wales Stripit Corp., 345 Payne Ave., North Tonawanda, N. Y. Copy of Catalog free upon request.

Zagar Indexing and Holding Chucks. A folder illustrating and describing various applications of Zagar Indexing and Holding Chucks is now being offered free by Zagar Tool, Inc., 23880 Lakeland Blvd., Cleveland 17, Ohio.



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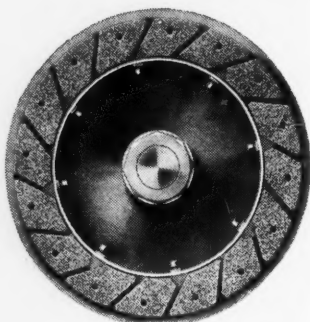


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Abrasive Company "Electrolon" Grinding Wheels for grinding cemented carbides are illustrated and described in a six-page folder—Form ESA-68—now available free from the Abrasive Company, Tacony and Fraley Sts., Philadelphia 37, Pennsylvania.

BarnesdriL Standard Hydraulic Units for special drilling, reaming, facing, boring, or tapping operations are illustrated and described in Bulletin No. 150 now being distributed by the Barnes Drill Co., 814 Chestnut St., Rockford, Ill. Copy free upon request.

"Fasteners" is the title of a booklet to be issued at regular intervals by the American Institute of Bolt, Nut and Rivet Manufacturers to provide executives with the factual engineering data they require in order to keep abreast of the important developments in the fasteners industry.

Executives desiring to receive copies of this booklet should write to American Institute of Bolt, Nut and Rivet Manufacturers, 1550 Hanna Bldg., Cleveland 15, Ohio.

"Hisey" Electric Grinders and Buffers are the subject of a 36-page catalog released by The Hisey-Wolf Machine Co., Cincinnati, Ohio. Designated as the No. 70, the catalog features illustrated, descriptive, and tabular information on bench and floor grinders; heavy duty bench and floor grinders; extra heavy duty floor grinders; 5, 7½, and 10 h.p. heavy duty floor grinders; combination wet and dry grinders; combination and double end disc grinders; bench type drill grinders; heavy duty drill grinders; heavy duty wet drill grinders; buffers and polishers; Tex-Drive grinders; Tex-Drive disc and combination grinders; heavy duty Tex-Drive snagging grinders; Tex-Drive wet grinders; Tex-Drive combination wet and dry grinders; Tex-Drive buffing and polishing machines; heavy duty Tex-Drive buffers and polishers; infinitely variable speed buffing and polishing machines; tool post grinders; angle plate grinders; vertical spindle grinders; and wide range precision grinders. Attachments and accessories for "Hisey" grinders and buffers are also shown and briefly described. Copy of Catalog No. 70 free upon request.

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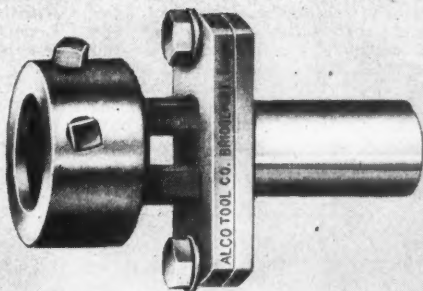
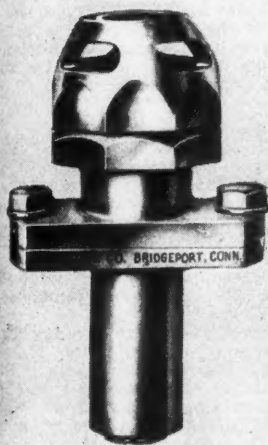
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For downright simplicity and accuracy, there is no die holder quite like ALCO. It's so easy to set up exactly on centers and maintain production in perfect alignment. Dies last longer because of even wear, and set-up time can be cut as much as 50%. Write for catalog of complete line of ALCO Tool Holders.

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Detroit: 908 Stephenson Bldg.
Chicago: 6219 S. Kenwood Ave.,
Hyde Park 6807



MODERN MACHINE SHOP 347

War Packing Manual. A manual containing samples of different types and grades of paper for packing war materiel for overseas shipment, together with condensed information regarding the various methods for properly packing such materiel, has been prepared by the Sherman Paper Products Corp., Newton Upper Falls 64, Mass. Copies of the manual are available to individuals having charge of packing or shipping operations.

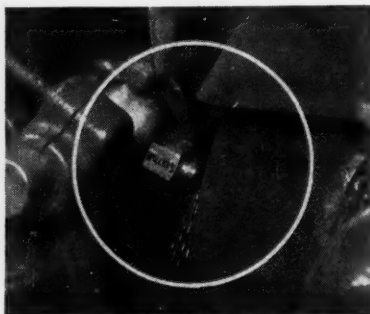
"A Study of Friction, Galling and Seizing" is the title of an eight-page bulletin published by the Meehanite Research Institute of America, Inc., Pershing Square Bldg., New Rochelle, N. Y. The bulletin presents new research data compiled from studies of galling, seizing, and scuffing of metal surfaces sliding in contact with one another. A complete description of the test methods is included and test results are charted and conclusions tabulated. Copy of Bulletin No. 17 free upon request.

"Planning the Future of Your Business." Concrete steps which may be taken by industrial employers in planning for high postwar levels of production and employment are set forth in great detail in a handbook, "Planning the Future of Your Business," prepared for the Committee for Economic Development by a special committee of the Association of Consulting Management Engineers.

The handbook is obtainable through the local Committees for Economic Development, now organized in 1,408 communities in all parts of the country.

Alcoa Standard Screw Products. A 60-page plastic-bound catalog featuring complete tabular information on the aluminum and aluminum alloy standard screw products manufactured by the Aluminum Company of America, Pittsburgh 19, Pa., has been published by this firm.

Contents of the catalog range as follows: Machine Screws; Bolts; Nuts and Washers; Rivets; Appendix; Screw Thread Data; Capacity and Facilities. Copy of catalog is available free to executives addressing requests on their company letterheads.

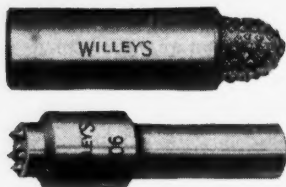


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Just off the press — 36 pages — covering standard and special tools.

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24 pages devoted to Willey's Diamond Tools and Mechanical Dressers. Get your copy today.

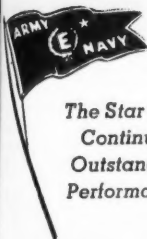
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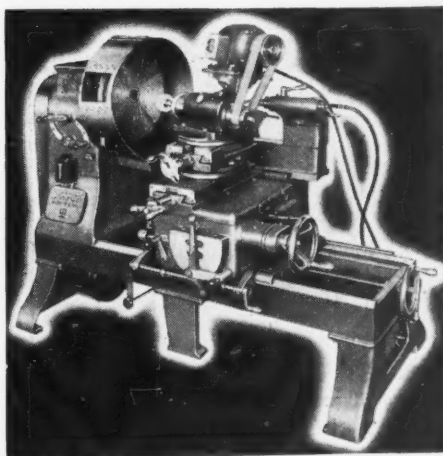
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The new, improved Lempco Model HGX heavy-duty universal grinder pictured to the right has a big 53" swing. It turns and grinds, internal, external, face and taper jobs! Compound, calibrated to thousandths, is easily and quickly set for precision taper grinds and turns! Three quick-change speeds for both cross-feed and table-feed. Automatic trips and feeds insure skilled work.

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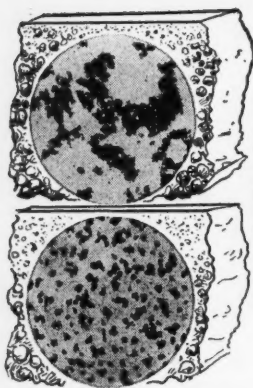
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MODERN MACHINE SHOP 349



Graphs of cross-sections: ordinary concrete (top) and AWOG (lower). Light areas are cement or bonding element; dark spots are aggregate. Lower graph shows perfect dispersion throughout mass obtained with AWOG.

New! Super - Resistant!

REPAIRS or RESURFACES

Machine Shop Floors

Here is a new, scientifically developed resurfacing material that will lick the pants off of "floor disintegrators" such as acid, water, oil, grease. Where conditions are such that ordinary concrete won't stand the gaff without plenty of headaches, AWOG solves the problem to a degree never before approached. Aside from its impervious quality, AWOG sets up a smooth, case-hardened surface which is dustless and durable under the most punishing traffic conditions. Withstands grueling loads, steel wheels, hard knocks. Sanitary and easily cleaned because its close knit, non-porous surface cannot harbor germs, filth, or waste matter. AWOG is recommended for new floors; for over-lays over brick, stone, or wood; for repairing or resurfacing areas of any size indoors or out.

It offers the utmost economy and trouble-free service to any machine shop or plant requiring a super floor.



Write for Further
Information and Details

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FLEXROCK Co.

3615 Filbert St., Philadelphia 4, Pa.

Please send me complete AWOG information . . . details of FREE TRIAL OFFER—no obligation.

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Company

Address

"Soluble Cutting Oil at Its Best" is the title of a 20-page booklet now being distributed by the D. A. Stuart Oil Co., 2741½ S. Troy St., Chicago 23, Ill. The booklet discusses typical problems involved in the selection and application of water-mix oils and is well illustrated with photographs of machining operations and laboratory tests. Copy free upon request.

Wetmore Reamers and Boring Bars. A 48-page catalog covering its complete line of adjustable, inserted-blade reamers, boring bars, and special tools is announced by the Wetmore Reamer Co., 418 N. 27th St., Dept. E, Milwaukee 8, Wis. Also contained in the catalog are data and tables of particular use to production executives and tool engineers. Copy of Catalog No. 44 free on request.

Newcomb-Detroit Catalog and Handbook of Engineering Data. Newcomb-Detroit Co., 5741 Russell St., Detroit 11, Mich., has issued a catalog completely describing its Uni-Wash dust collectors, spray booths, metal parts washers, ovens, and other sheet metal equipment. The catalog is fully illustrated, including cutaway drawings of equipment mechanisms and size and capacity charts. In addition, the catalog features a 36-page engineering data section containing useful information for engineers working with sheet metal. Copy is available to executives addressing requests on their company letterheads.

Engineers' Bulletin 1-44ER. Engineers' Specialties Division, The Universal Engraving & Colorplate Co., Inc., 588 Monroe St., Buffalo 11, N. Y., has prepared a 20-page bulletin illustrating and describing radius charts, radius discs, protractor charts, projector scales, and projector rules for use on all makes of optical comparators, measuring and micro projectors. Supplementing this bulletin is a booklet giving specifications and prices of all sizes and types of charts, screens, rules, scales, chart holders, adapters, and filing cabinets offered by Engineers' Specialties Division.

Copy of Bulletin 1-44ER together with specification and price booklet is available free to individuals connected with the operation of optical comparators.



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SOCKET SCREWS

SAVE TIME • TEMPERS • TROUBLE

The Knurled Head of the "UNBRAKO" Socket Cap Screw saves time because fingers can turn it without slipping and lost motion. Where many cap screws are used in production, this saves MUCH time.

The "UNBRAKO" Self-Locking Hollow Set Screw with knurled point **WON'T WORK LOOSE** because the knurled point "digs in" and holds the screw tight regardless of vibration.

The knurling of heads and points saves time, tempers, trouble for users of "UNBRAKO" SCREW PRODUCTS.

All "UNBRAKO" Socket Screws are accurately made and have unusual strength and hardness.



"UNBRAKO" Knurled Socket Head Cap Screw



"UNBRAKO" Self-Locking Hollow Set Screw With Knurled Point.
Patents Pending.

Both the "UNBRAKO" Knurled Socket Head Cap Screw and the "UNBRAKO" Hollow Set Screw with Knurled Point are made in a full range of lengths and in sizes from No. 1 to 1 1/2" in diameter.

Knurling of Socket Screws Originated With "UNBRAKO" Years Ago.

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MODERN MACHINE SHOP 351

Metco Metallizing Equipment. The complete line of metallizing equipment offered by the Metallizing Engineering Co., Inc., 38-22 30th St., Long Island City 1, N. Y., is described and illustrated in a 16-page catalog, designated as the No. 42B, now available from this firm free upon request.

Ruthman "Gusher" Coolant Pumps. A 60-page catalog of Ruthman "Gusher" Coolant Pumps is now being issued by The Ruthman Machinery Co., 1823A Reading Rd., Cincinnati 2, Ohio. This catalog is conveniently tab-indexed according to sections. Each of the seven sections is devoted to a particular type or accessory of Gusher coolant pump—immersed type; outside mounted type, pipe connected; outside flange mounted type, external discharge; outside flange mounted type, internal discharge; belt-driven types; shaft-driven type; plain drive attachments; mounting brackets, and coolant tanks.

Specification sheets are shown for the entire Gusher line. A wealth of information is given, including facsimiles of blueprint drawings, capacity in gallons

per minute, motor current characteristics, and so on. Individual price sheets follow specification sheets in each section.

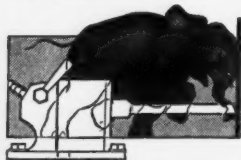
Copy of catalog can be obtained by requesting it on company letterhead.

Abrasive Company Mounted Wheels and Mounted Points, including Victory points with demountable spindles, are covered as to construction, dimensions, shapes, prices, uses, and so on, in a 24-page catalog published by the Abrasive Company, Tacony and Fraley Sts., Philadelphia 37, Pa. Copy of Catalog Form ESA-67 free upon request.

Machine Products Catalog. Published by Machine Products Corp., 6773 E. McNichols Rd., Detroit 12, Mich., this 12-page catalog includes illustrated, descriptive, and tabular information on surface plates, angles, parallels, V-blocks, straightedges, cylinder squares, Rotabs, knobs, levers, crank handles, straight and offset handles, and handwheels. Copy free upon request.

Announcing MEAD MIDGET AIR CLAMPS

**Horizontal and
Vertical!**



Both models deliver 80 lbs. pressure on a line pressure of 100 lbs. They'll save countless man-hours in assembly operations involving welding, riveting, bolting, etc. Advantages over mechanical clamps: 1. Any number can be operated by single master valve. 2. Easily installed in cramped corners. 3. Equal ram pressure at any stroke point. Send for new Mead AIR POWER Catalog, describing our line of Air Clamps, Air Vises, Air Presses, Work Feeders, Valves, Controls, etc.

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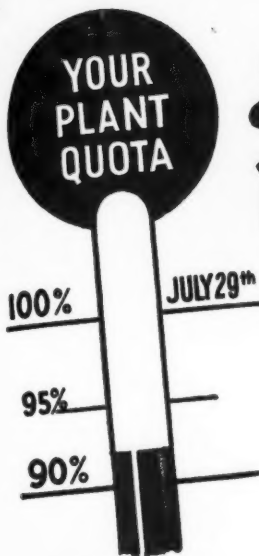
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Here's the Quota Plan:

1. Plant quotas are to be established on the basis of an average \$100 cash (not maturity value) purchase per employee.
2. Regular Payroll Savings deductions made during the drive accounting period will be credited toward the plant quota.
3. Employees are expected to contribute toward raising the cash quota by buying extra 5th War Loan Bonds: 1—Outright by cash. 2—By extra installment deductions. 3—By extra installment deductions plus cash.

Example: JOHN DOE Mfg. Co. — 1,000 Employees
1,000 employees x \$100 = \$100,000 Cash Quota

Regular Payroll deductions during the eight weekly payroll Accounting Periods of June and July.	30,000
	\$70,000 (to be raised by sales of extra Bonds)

BACK THE ATTACK—SELL MORE THAN BEFORE



The Treasury Department acknowledges with appreciation the publication of this message by

MODERN MACHINE SHOP

This is an official U.S. Treasury adv.—prepared under the auspices of Treasury Department and War Adv. Council

Stay at Your Battle Stations!

MANAGEMENT • LABOR

—The 5th War Loan Drive is still on. July 29th is the last payday in the drive.

The U. S. Treasury has set the overall goal at \$16,000,000,000—\$6,000,000,000 from individuals alone. This is the biggest sum ever asked of the American people—and it must be raised!

Keep fighting. Tighten up your 5th War Loan Drive organization. Step up your solicitation tempo. Drive! Drive!! Drive!!! Hit your Plant Quota's 100% mark with a bang that'll proclaim to all the world that the U. S. Home Front is solidly in back of the Fighting Front.

Need help? Need ideas? Call on the Chairman of your War Finance Committee.

Weltronic Technical Bulletin No. 75-51-50. Issued by the Weltronic Co., 20735 Grand River Ave., Detroit 19, Mich., this bulletin covers features, specifications, and functions of the Weltronic Synchronous Resistance-Welder Control Model No. 75-51-50. Copy free upon request.

Sciaky PMCR 2S-31 Electric Resistance Rocker Arm Welder for aluminum and light alloys is the subject of a 20-page illustrated bulletin released by Sciaky Bros., 4915 W. 67th St., Chicago 38, Ill., covering advantages, electrical and mechanical features, applications, specifications, and so on. Copy of Bulletin 105-B free upon request.

Precision Production Tools are illustrated and described in catalog, designated as the No. 44, which has been published by the Acme Tool Co., 202 Church St., New York 13, N. Y. The catalog features unusual tools which are said to have contributed to increased production wherever used. Copy is available free upon receipt of a request addressed on company letterhead.

Victor Apparatus Bulletin. A 16-page bulletin presenting in full color the line of welding and cutting equipment offered by the Victor Equipment Co., 441 Folsom St., San Francisco, Cal., has been prepared by this firm. Copy available by requesting Form 20.

Harding Style "S" Sure-Grip Master Collets and Pads for National Acme, Cone, Greenlee, Gridley, and New Britain automatics are covered as to features, list prices, capacities, and so on in a four-page illustrated bulletin issued by Hardinge Brothers, Inc., Elmira, N. Y. Copy free upon request.

Tungsten Carbide Stock Blanks. A four-page bulletin containing complete tabular information on the line of standard Carbology tungsten carbide tips carried in stock by the Tungsten Carbide Tool Co., 2661 Joy Rd., Detroit 6, Mich. is now being distributed by this firm. Copy of Bulletin No. 44-2 free upon request.



SPIRAL POINT TAPS

Often called "Chip Driver," "Gun," or "Chip Chaser." Have you learned the advantage of using this type of Tap on certain jobs? Designed to give a shear cut driving the Chip ahead of the Tap, it can be used to great advantage on many classes of Tapping except in blind holes that are not drilled deep enough to accommodate the chips.

It is especially recommended for open holes in tough materials. The Spiral Point Tap is very free cutting and must not be forced too fast in soft metals like Aluminum and Copper or rough threads will result.

Reiff & Nestor Company can solve your Tapping problems.

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